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# THE IMPACT OF THE WAR ON THE VENEREAL-DISEASE PROBLEM*

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WASHINGTON

THROUGH all history, syphilis and gonorrhea have been destroyers of the efficiency of armed forces. The story is familiar. During World War I, 6,800,000 man-days were lost in the United States Army because of venereal disease — equivalent to a year's absence from the service of 19,000 men. Actually, the number of new infections with venereal disease in the Army exceeded by 100,000 the number of battle casualties. Furthermore, in the Navy and the Marine Corps, 687,000 days were lost from duty because of venereal disease.

Material progress has been made in the fight against the venereal diseases, even though they have remained a major cause of noneffectiveness among the armed forces since 1918. This statement can be made in spite of the high prevalence of venereal diseases demonstrated by the routine serologic examination of selectees during mobilization for the present war. In the first million men, approximately 45,000 were found to have serologic evidence of syphilis or clinical manifestations of the primary and secondary stages of this disease.[1] An additional 15,000 were estimated to have gonorrhea. The preliminary data available on examination of the second million selectees confirm these figures. It would be extremely helpful to have available comparative data on the prevalence of syphilis in the men mobilized during World War I. The serologic test for syphilis in 1917 was new, expensive and technically much less reliable than at present. It was therefore not utilized routinely in the examination of the selectees, and a comparison cannot be made.

It is essential, however, to review some of the progress that had been made in the control of syphilis and gonorrhea before the beginning of the recent mobilization, that we may compare, in the future, the control problems of venereal disease at the beginning and the end of the current war. Surveys[2] of sources of treatment in forty areas throughout the United States, representative of all sections of the country, were completed by the United States Public Health Service in 1935. Approximately 25 per cent of the total population of the country dwelt in these areas. The returns on these surveys included reports from more than 97 per cent of the treatment sources in such areas. The data available indicated that syphilis might be expected to strike one person in ten at some time during his life.[3] A year ago, the most careful statistical studies utilizing the material available from the routine serologic examination of selectees showed that the chance of acquiring syphilis is about one in fifteen. Consequently, each person stood only half the chance of being infected with syphilis in 1941 that he did about ten years previously.

Massachusetts has taken first place many times in the syphilis-control program. It was first to require the reporting of syphilis as a communicable disease; first to provide serologic tests without cost; and first to distribute antisyphilitic drugs to private physicians. Its hospitals were encouraged early to start venereal-disease clinics. If Massachusetts were an island, — out of touch with infections from without, — it is probable that the control measures carried on so far would have been sufficient to reduce the prevalence of syphilis to the low prewar rate in Scandinavian countries.

In industry, great gains have been made in the solution of the syphilis problem. Prewar results of blood tests on applicants and employees in eighteen of the large plants of the E. I. du Pont de Nemours Company, for three periods since the beginning of their program against syphilis, provide an example. Tests made on 27,000 people by this company during 1934 and 1935 yielded a prevalence rate of 39 per thousand. The rate of 51,000

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tests made in 1937–1938 was practically the same — 40 per thousand. But among 35,000 persons tested in 1940–1941, the rate dropped significantly — to 10 per thousand. Gehrmann,[4] chief industrial surgeon of this company, is of the opinion that this reduction in the prevalence of syphilis in widely scattered industrial plants was due primarily to insistence on regular treatment of infected employees. Similar reductions have been described by the surgeons of many other industries.

Even in the southern States, where the prevalence of syphilis had almost reached the saturation point, progress was made when the disease was attacked vigorously. As an example, in Glynn County, Georgia, where the first mobile unit for the control of syphilis was provided, the syphilis prevalence rate among Negroes in 1937–1938, the first year of operation of the mobile unit, was 391 per thousand.[5] In the early part of 1941, however, the rate had dropped to 23.4 per thousand. In 1937, not one clinic patient in Glynn County had received the minimum treatment of twenty injections each of an arsenical compound and of bismuth. By March, 1941, 46 per cent of all patients admitted to the mobile clinic with early syphilis had received this protection. Most significant of all, the Negro stillbirth rate in this county has been reduced from 100 to 44 per thousand live births since the beginning of the syphilis-control program.

The first significant reversal of the downward trend in the venereal-disease rates was recorded recently when the Surgeon General of the Army reported that the admission rate for all venereal disease for the whole Army for the calendar year 1940 was 42.5 per thousand as compared with 29.6 in 1939.[6] This trend upward has usually occurred in time of war and should stimulate an all-out application of every modern method for the control of the venereal diseases, in both the armed and the civilian populations. Provisions for early diagnosis and facilities for the institution of prompt treatment now exist in almost all areas with full-time local health services. The scarcity of trained personnel has handicapped the follow-up program, and some intelligence and ingenuity will be required to maintain the work at a satisfactory level. It may well be, however, that the solution of the war-time venereal-disease problem lies in individual prophylaxis. We must, as Lahey[7] recommends, attempt to educate men to avoid venereal disease, but we must likewise understand that if this cannot be accomplished the necessity for prophylaxis must be promoted "even if it seems compromising to a sentiment." Today, as we are forced to spread even more thinly our supply of medically trained personnel, we must not ignore the possibility of reducing case loads by taking every reasonable opportunity to prevent infections altogether.

One of the shocking revelations in the prostitution racket of recent years has been the participation of private physicians in the plunder. Time and again, where tolerated prostitution exists, the people in the community are given a false sense of security by being told that the prostitutes are rendered safe from venereal infections because they are subjected to periodic physical examinations. Much too frequently, reputable members of the medical profession perform these perfunctory examinations, and the prominence of the physician often lends support to the erroneous belief that this system is effective.

One among many instances can be cited that exemplifies the deplorable, yet profitable, part that private physicians have played in tolerated prostitution. Recently, the mayor of a city of about 50,000 openly supported a segregated area in which were located between 200 and 300 prostitutes. Nearby, the Army had concentrated men approximately equal to the total population of the town. The segregated district was doing a tremendous business, and the usual arguments against prostitution did not force the mayor to yield. He contended that the women in the area were examined periodically and were not the source of venereal diseases in the armed forces, although the Army rates were unusually high. Further investigation showed that the son of the mayor was a physician in private practice who was examining weekly the women in the segregated area at fees ranging from $3.00 to $5.00. It was not until the governor of the state brought pressure to bear on the mayor and his son that they could be persuaded to discontinue their support of the segregated area. The son, incidentally, was a reputable physician in the community and a member of the usual medical societies. Can we, as physicians, expect the public to take aggressive action against prostitution when some of the members of our own profession support the racket so flagrantly?

The routine serologic examination of selectees has produced a most serious problem of treatment and follow-up for infected men, who at the present time are excluded from military service. The record shows that serologic or clinical evidence of syphilis exists in approximately 45,000 of each million selectees examined under the Selective Service System. This rate holds true for the first and the second million, and it is estimated that within the next year 200,000 men with evidence of syphilis will have been discovered and excluded from military service. It is the obligation of the health officer and the physician in private practice to rehabilitate these syphilitic selectees.

Records showing the number of infected selectees brought under treatment throughout the United States are as yet incomplete. Steps are being taken to obtain better information as soon as possible. Present data available to the Public Health Service, however, show that on an average only half the infected selectees in the United States are being brought to treatment, and the percentage varies greatly in different sections of the country, depending on the existence of full-time local health services and a control problem for venereal disease well integrated with the local selective-service board. In many places with aggressive and efficient health officers, 100 per cent of the selectees are brought to treatment with the assistance of interested local selective-service boards. Other health departments do not do so well. When no health service is available, the entire responsibility for the treatment of infected selectees falls on the medical profession, and in such places, often only a very small fraction of the total infected selectees are brought in for examination and treatment. If during the next few years the numerous syphilitic selectees discovered through wartime examinations are given adequate treatment for their infections, one of the greatest accomplishments yet attained in the control of syphilis will have been made. If this opportunity is lost, however, it will constitute one of the greatest public-health and medical failures in the history of the United States.

In terms of relative prevalence, gonorrhea is four to eight times as common in the armed forces as syphilis. Comparative rates are not available for the civilian population, but it is quite probable that gonorrhea occurs there in much the same ratio. It is most discouraging that all health officers and physicians are not taking advantage of the modern methods for the treatment and control of gonorrhea. Studies by the American Neisserian Medical Society, a great organization originally planned by the members of the Massachusetts Neisserian Medical Society, in co-operation with the United States Public Health Service, prove conclusively that there is no reason whatever for the high prevalence of gonorrhea if we will but apply present-day knowledge. Every man and woman with gonorrhea should receive the routine scheme of treatment recommended by the Executive Committee of the American Neisserian Medical Society.[8]

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In all history, war has opened the gates to pestilence. Venereal disease strikes first, and its wounds are often the last to heal. At the present time, the United States is better prepared than ever before to wage an effective campaign against gonorrhea and syphilis. Tolerated prostitution and failure to apply promptly modern medical knowledge are the most vulnerable points in this field of medicine. Will the people of our democracy follow through against the venereal-disease foe within as efficiently as we will wage war against our enemies from without?

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# MASSACHUSETTS PUBLIC-HEALTH PROBLEMS IN WARTIME*

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BOSTON

WARTIME demands on public-health services are compelling in their urgency. A people fighting for its existence scrutinizes each new activity with but a single thought in mind: will this add to our combined strength and further our effort in the ordeal that confronts us? Slowly but surely, we are coming to the realization that, remote as this present world conflict appeared at first, it has become a stark reality in the daily life of every one of us. Our present national responsibility is enormous. The responsibility of those of us engaged in public health is equally grave.

Under normal conditions, a critical appraisal of current activity and of new developments is a deserving procedure in any well-regulated health department. An evaluation of recent developments is particularly appropriate at this time. When existing resources are being taxed to the utmost, when so large a part of our national wealth is being devoted to the war effort, when increasingly severe burdens are being heaped onto our economic structure, it is extremely necessary that each new undertaking be examined in minute detail. In assuming new responsibility, our professional personnel must be utilized in the most efficient manner. Emphasis must be placed on those services most intimately and directly concerned with our national security. Our entire public-health program must comply with this ideal to ensure its permanency.

During wartime, increased attention must be given in public-health programs to those groups in the general population who bear the brunt of the burden. After a critical review of the high percentage of rejections for physical defects among young men examined under the Selective Service Act, we come to a realization of the need for increased health service for the youth of our nation. I say this although I realize that, to some extent, this high percentage of rejections is due to higher health standards for the acceptance of selectees than those in World War I.

Although it is true that many of the defects date back to inadequacies having their origin during infancy and early childhood, it is evident that increasing emphasis must be placed on the preservation of health during later childhood and adolescence.

No one can foretell the duration of this war. The high-school student of today may be the soldier of tomorrow. In industry, young girls in large numbers will take on themselves the responsibilities formerly assumed by men. The increase in tuberculosis among young women already noted in England is a warning that should not be allowed to go unheeded. Our present public-health program must include measures that will safeguard in every possible way all our people, with particular emphasis on those who are directly engaged in war efforts of one type or another.

Before outlining actual developments, I shall make several generalizations concerning the relation of the Massachusetts Department of Public Health to health authorities at various other levels. The department stands midway between local and national health organizations. In most of its functions, it acts as an advisory and investigative body. Actual legal health authority is most frequently vested in local boards of health, this being a natural development of local autonomy, the fundamental political concept in Massachusetts. Similarly, federal authority has been limited by the Constitution to certain specifically designated powers beyond which it is essentially advisory in character. With the passage of time, more specific duties have been delegated to health authorities at the federal and state levels.

During the last decade, this nation has been passing through a period of intense social reform. It is difficult to comprehend the vast transformation wrought by the Social Security Act. Titles V and VI of this act have had a profound influence on public-health practice throughout the entire country. State budgets have been augmented by federal funds. Existing services have been improved, and new ones added, according to definite stipulations by federal authorities regarding the manner in which this money may be expended. Title V funds pertain to maternal and child-health services and the crippled-children's program, and are under the supervision of the Children's Bureau of the United States Department of Labor. Title VI funds, which are for general public-health administration, are under the supervision of the United States Public Health Service.

As this nation passes from a peacetime to a wartime footing, the tendency for federal subsidi-

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zation has become more marked. The proposed plan for rehabilitation of men rejected by selective-service boards and the contemplated establishment of medical and public-health services in federal housing projects indicate the interest that federal agencies are paying to state and local health problems. Bearing these considerations in mind, we may turn our attention to several of the more important developments in public-health practices in Massachusetts.

In October, 1940, the first step was taken to establish the district health officer as the administrative co-ordinator or director of state health-department programs in his district. Through the use of available personnel and in some instances the transfer of personnel, the health officer in the Worcester area was sufficiently equipped to carry out a complete public-health program in his constituent communities. This plan of localization was extended in February, 1941, to the Greenfield area, and in the last few months, to the Springfield and Pittsfield areas. We are, at present, completing plans to handle the work in the southern area through an office in New Bedford. The remaining districts, those in and around the Metropolitan area and on the North Shore, will be organized as soon as practicable.

This so-called "district plan" provides office space and clerical assistance for the district health officer and various field personnel, such as public-health nurses, nutritionists, and sanitary officers, medical social workers and others who have hitherto worked as individuals out of either the Boston office or their own homes. Such personnel is regarded as making up the staff of the district health officer, who is responsible for the administrative direction of their field work. Each district health officer will make every effort to apprise himself of the health needs and resources of the various communities in his district and will endeavor, through the efficient use of his staff, to find a solution for these needs.

We know that this change will tend to lend dignity and responsibility to the position of district health officer and will result in a reduction of duplication of effort on the part of the state personnel. It is particularly pleasing to me, and I am sure it should be to you, to realize that the state public-health program is to be supervised in each district by the district health officer, a physician and fellow member of this society.

The district plan created a need for someone in the central office whose duty it would be to effect its success. Accordingly, the position, "assistant to the commissioner," was established and charged with the responsibility of local health administration. One of his tasks is to make certain that the district health officers and their staffs function as desired and work as well-co-ordinated field units. He must maintain close contact with the division directors, be familiar with their programs and make certain that they are completely and satisfactorily carried out by the district health officers and their staffs.

With the rapid growth and development of the public-health nursing activities of the department and their extension into channels other than maternal and child health, it has long been deemed more practical to administer this program from the Division of Administration rather than from a specialized division of child hygiene. Consequently, the public-health nurses have been transferred from each of the divisions concerned to the Division of Administration, where they are in a unit under the direction of a chief supervisor of public-health nursing. Similarly, the supervisor of medical social service was transferred from the Division of Adult Hygiene to the Division of Administration.

Responsibility for the work of these units has been delegated to the assistant to the commissioner as part of local health administration. All the changes described are in line with public-health practices in the majority of the other states and in accordance with the best administrative advice on the matter.

Another new activity is a study of ragweed eradication, which has assumed an ever-increasing prominence as a public-health problem, since it has been estimated that between 3 and 5 per cent of the general population is hypersensitive to windborne pollen. Because of its many public-health aspects, the Legislature directed the department to make a study concerning the eradication and control of ragweed. Observations made under this study have disclosed that, in New England, ragweed is the only important factor in late summer and fall hay fever. In addition, the discoveries that during the late summer and early fall, pollen is encountered in the air in fairly even concentrations up to the height of one mile and that it is carried by the wind for many miles have revealed that, to be of any value, control programs require the active participation of neighboring communities throughout extensive areas. Small-scale campaigns are absolutely futile. With the aid of all interested official and voluntary organizations, the study is being continued to obtain as complete information as possible. Data thus compiled will become the basis of recommendations to the Legislature for ragweed elimination.

Thus far, I have said very little regarding legislation. However, it should be of interest that on a national level a very high percentage of the pending bills concern health. I should like to sug-

gest that your committee on legislative matters be thoroughly alert to the trend, particularly on the federal level, to the introduction of legislation having to do with public health. Locally, during the last several years, the Legislature has seen fit to inaugurate new health laws and amend old ones. Inasmuch as it is impossible at this time to describe all the new laws that relate to public health, I shall outline briefly one or two of the more significant ones.

Up to January, 1942, there was no law that required the licensing of hospitals; hence, the supervision of general hospitals had never been allocated to any specific state agency. There were no standards concerning their construction or maintenance, except for local fire ordinances and zoning laws. It is quite obvious that such a system was open to many abuses. Although the state laws required that clinics and dispensaries be licensed by the Department of Public Health, maternity hospitals or wards by the Department of Public Welfare, and mental-disease hospitals by the Department of Mental Health, hospitals in general were not regulated. All this was quite illogical and was not conducive to the best interests of the public. If a license is necessary for one type of hospital, it is reasonable to expect that all hospitals should be licensed. The Legislature of 1941 remedied this situation by enacting a law that made it mandatory that general hospitals be licensed by the Massachusetts Department of Public Health. An advisory committee was appointed to assist the department in formulating the rules and regulations that are being established in connection with this work. Every effort and consideration will be made not to insist on unreasonable demands on hospital administrators.

The premarital health-examination law, with its amendments, became effective on November 1, 1941. Applicants for marriage licenses must present a health certificate signed by a physician practicing in Massachusetts or by a medical officer on active service with the armed forces of the United States. Certain aspects of the law are not entirely clear at the present time, but it is expected that future amendments to clarify them will be recommended by the department at the next session of the Legislature.

The immediate objective of the Department of Public Health is to stimulate and maintain vital health services, and I take this opportunity to assure you that, as a department, we are making every effort to concentrate on services that must be kept at a maximum level during the present emergency. To avoid duplication of effort in our defense work, all such activities are being organized in the Division of Administration. Every effort is being made to save in the use of automobiles, and we have put a number of them into dead storage for use at a future time. We realize that there will be a tendency, for economical reasons and because of pressure of other business, to cut down on accepted public-health practices in many of the communities. We are striving to prevent this. Massachusetts enjoys an enviable record in communicable-disease control, environmental sanitation, nutrition, cancer control, and medical and surgical care. Our standards must not be lowered.

The district health officers have been appointed regional directors for health by the Massachusetts Committee on Public Safety, and so far as possible, their activities have been co-ordinated. Plans are being kept up to date for the immediate mobilization of the state health personnel in any part of the State, should this necessity arise.

The department is co-operating with the Army and Navy in an effort to control syphilis and gonorrhea in the armed forces and among civilians by providing an epidemiologic service whereby nurses connected with the department directly interview infected persons for the purpose of discovering the sources of infection and the places at which contacts or exposures occurred. The information acquired by this epidemiologic investigation is utilized by the armed forces, the Department of Public Health, police agencies and other interested groups in a co-operative effort to control genitoinfectious diseases.

My foregoing remarks have been confined principally to present or past work of the department. It may be well to mention briefly what our future programs may possibly include.

As you know, the department has participated in a study of a selected number of cases of arthritis at the Massachusetts General Hospital, and it is likely that an expansion of this type of activity will result in our making a similar study, in co-operation with recognized treating agencies, of cardiac conditions, which continue to be a major cause of death in the older age groups. For some time, we have been considering, and have submitted to this society, plans for a rheumatic-fever program, which would indeed be a worth-while activity. That the department may plan for increased facilities for custodial and palliative care of cancer patients, while they await admission to and after their discharge from the Pondville or Westfield hospitals, is also logical. The Kenny method for prevention and treatment of paralysis in anterior poliomyelitis might be the subject of detailed study and evaluation as part of our crippled-children's program.

Before concluding, I wish to state that, here in

Massachusetts, we have been very fortunate in being accorded the complete co-operation of the medical profession. I emphasize the facts that without this complete co-operation our enviable record in public health would have been impossible and that a satisfactory program for the future would be in serious doubt. Be assured, that, as public-health activities expand under the stimulation of federal agencies, we shall keep in mind the physicians' interests and, through our district health officers, shall endeavor to keep you informed of changes as they are contemplated.

I sincerely hope that these few remarks will give you a better appreciation of our administrative organization, of some of our present activities, and of a few of our possible future channels of activity.

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## INDUSTRIAL HEALTH AND THE WAR*

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BOSTON

OUR country has a war to win. President Roosevelt has said that it will be won by industrial production, that is, by the production of overpowering numbers of planes, tanks and guns and all manner of weapons and ammunition, and of fighting ships and of freighters, to bring all these arms safely and abundantly across the seas that our allies and our gallant men around the world may victoriously finish the jobs they are about. It is apparent, therefore, that our sailors and soldiers on the firing lines and our "soldiers" in overalls on the production lines are entirely dependent on each other. If production fails, our army is without weapons; if our armed forces fail, the workers in industry will become workers in chains.

Thus, the worker in industry, not only in essential war industry, but in practically all industries,— because today nearly all are contributing something to the war effort, — has been given a place of special prominence in the war. His ability to measure up to it depends heavily on his physical fitness, his freedom from preventable disease and injury, his mental stamina and his morale. Thus, loss of working time, especially by skilled workers, no matter what the cause, must be regarded today as equivalent to casualties. It is therefore our patriotic duty as physicians to contribute our best efforts to the conservation of the health of these necessary men and women in industry, so that the loss of precious work hours may be minimized.

Probably, few persons, especially persons not in industry, fully realize the demand that this war has put on the industrial manpower of the country: to build up the armed forces and to produce all the material that the armed forces will need to win the war. And probably, few persons appreciate the magnitude of the losses of manpower from industry incurred through accidents and, especially, nonoccupational sickness.

If plans progress as scheduled for this year, the Army will be increased to 3,600,000 men, and the Navy and the Marine Corps to 1,000,000 men, a total of 4,600,000 men, virtually all of whom will have been drawn from the main industrial force. Eventually, the Army may be increased to 8,000,000 or more men. And they are the men best qualified physically and mentally for industry. They have formed the framework of all industrial production.

In peacetime, 34,000,000 out of America's labor force of 52,000,000 persons are employed in industry. Of these, about 9,000,000 have already been shifted to direct war-production activities. Watchmakers have become blacksmiths, and dungarees have replaced white collars. The number must be increased this year to approximately 18,000,000 persons to meet the production schedules laid down by the President. War this year will be the business of more than 22,000,000 of our fellow citizens. It will mean that half of all the men in the country between the ages of twenty and sixty-five years will be in the armed forces or in war production before the end of the year. It will mean the continued shifting of industrial workers from peacetime pursuits to war production, to jobs with which they are unfamiliar and with hazards to their health and safety. It will mean the absorption into war industry of several million women now engaged in home duties or unemployed whose health deserves protection. It will mean the employment in industry of the somewhat reckless young men and women between seventeen and nineteen years of age, — major accident risks, — of men past sixty years of age and of many physically handicapped persons — girls without fingers or with immobile hands and fingers, one-eyed persons and the like. It will mean that industries not directly engaged in war production, but nevertheless essential to the war effort, such as agriculture and the public serv-

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ices, and industries essential to the preservation of civilian morale will absorb the less physically able to work of America's labor force. It will mean an appreciable increase in accidents, occupational diseases and nonoccupational illnesses unless adequate protection for the health and safety of all these workers is provided.

Our country has the manpower and the womanpower to win this war, if they are kept vital. Therefore, industrial health becomes an acute problem: the world's greatest production unit must continue to emit the deep and resonant hum of machinery working at full efficiency.

When Japan sneaked into Pearl Harbor, everybody was grievously shocked by the report that 2600 young men had been killed. Few of us, however, are seriously impressed by the very much larger number of fatal and other accidental injuries daily occurring in civilian life — a most unfortunate situation in these days when every available man is needed, and when every hour counts in our industrial production for war.

The aggregate loss of manpower from industry because of accidents arising out of and in the course of employment is startling.[2] It is generally estimated that actual lost time owing to temporary disabilities sustained in occupational accidents in the United States averages at least 800,000 days each week,[2] or approximately 40,000,000 days each year. That equals the work days required to produce over three thousand bombers. Last year, 18,000 persons were killed in occupational accidents, and more than 90,000 others suffered permanent disabilities. Together, these accidents account for the loss of approximately 4,000,000 workdays each week, the workdays necessary to build eight destroyers.[2] But the time losses in industry caused by nonoccupational, off-duty accidents are far greater than all the losses due to occupational accidents and occupational diseases combined; in fact, they are more than twice as high.

Huge as these losses of vital man-hours sabotaged by accidents may appear to be, they account for only a small fraction of all the lost time in industry. Nonoccupational diseases, all the ills of the body and of the mind and the emotions to which the human flesh fell heir, deprived industry last year of approximately 3,000,000,000 work-productive man-hours, or nearly 400,000,000 workdays. Some of the loss is, of course, unavoidable, some of it can be salvaged through better placement of the worker and by preventive medicine and co-operation from the private physician, and some of it, unquestionably, can be saved by stimulating greater loyalty to the job in this critical hour. If we could save even a tenth of this lost time due to sickness, the need for long hours of work and the seven-day week could be materially reduced, the vicious circle between fatigue and lost time broken, and production definitely increased.

These are the problems of industrial health — occupational accidents, occupational diseases, off-duty accidents and nonoccupational sickness. Industrial health and industrial efficiency go hand in hand. If industrial health breaks down, production will fail. If production fails, the boys who fell at Pearl Harbor, at Bataan and at Corregidor will have made the supreme sacrifice in vain.

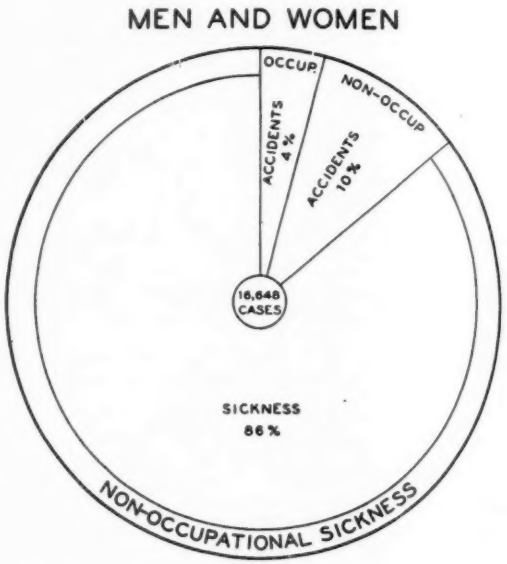


FIGURE 1. *Distribution of Lost Time (1936–1940). The cases include those of occupational accidents with one or more days of lost time and those of nonoccupational accidents or sickness with eight or more days of lost time.*

To maintain industrial health at a productive level is the province of industrial medicine. Industrial medicine may therefore be regarded as the science that deals with prevention, alleviation and cure of diseases that affect gainfully employed persons.[3] It is a field of special medical interest comprising the practice of medical-department administration, medical supervision, preventive medicine, toxicology and public health within the confines of industry.[3] Its objectives[4] can be accomplished by the prevention of disease or injury in industry through the establishment of proper medical supervision over industrial materials, processes, environment and workers, by the health conservation of workers through physical supervision and education and by medical and surgical care to restore health and earning capacity as

promptly as possible following industrial accident or disease.

No revolutionary changes in well-managed industrial health programs for peace are required to remodel them for production for war. Health

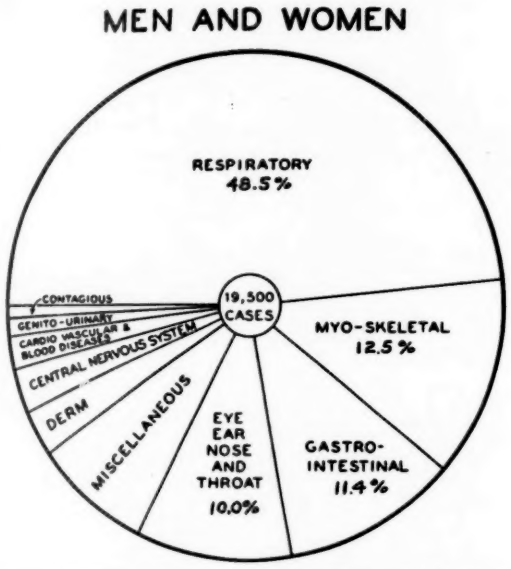


FIGURE 2. *Frequency of Medical Diagnoses in Illnesses of More Than Two Days' Duration (1941).*

measures that have long been recommended and used successfully in large industries should be applied with greater interest and renewed vigor and more extensively to include the small plants of 500 or less workers, where about 70 per cent of all industrial workers are employed, and where there is good reason to believe that the individual worker is exposed to more hazards or to the same hazards in more ways than the man in the large plant, because their frequency and severity rates of accident are definitely higher.

The major health measures[4] may be enumerated as follows:

*Prevention.* The physician should acquaint himself, by regular inspections, with all materials and processes used in the working environment over which he has supervision, to the end that he may recommend appropriate protection of workers from conditions actually or potentially harmful.

Prevention requires provision for a safety organization with a definite and active program in accident prevention, which includes close supervision of the new inexperienced worker and the placing of the accident-prone worker in less dangerous jobs. All workers should be trained in first aid. (At the end of June, 1942, we shall have completed the training of nearly 8000 telephone workers in five New England states in the standard first-aid course of the American Red Cross.)

*Industrial physical examinations.* Preplacement physical examinations should be used to fit each person to a type of work that he is able to perform continuously without undue impairment, without injury to himself or to his fellow workers and with profit to himself and to his employer. Rejections should not exceed 3 per cent.

Subsequent physical examinations should be complete enough to provide positive health protection for all workers and to safeguard public

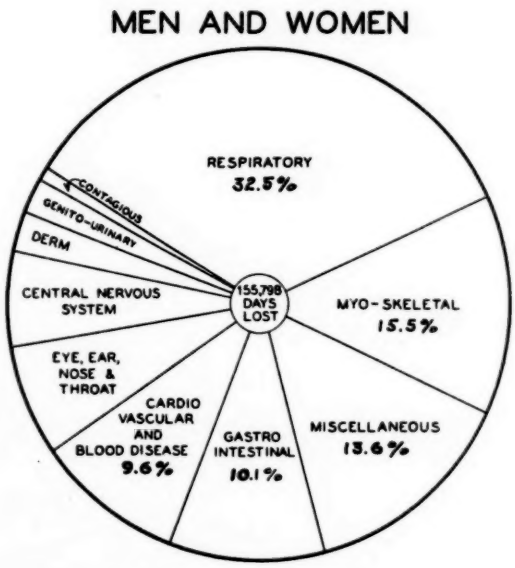


FIGURE 3. *Frequency of Medical Diagnoses in Severe Illnesses of More Than Two Days' Duration (1941).*

welfare. Repetition of such examinations should be governed by the circumstances of exposure and health.

*Health education.* The plant physician should take advantage of all opportunities for instruction of the workmen in hygienic living, both in and out of the industrial environment.

*Medical and surgical care.* In the treatment of compensable injuries and diseases, the disabled worker, after first-aid care, should be free to choose his physician from all those licensed doctors of medicine competent to supply the required services. The plant physician should co-operate to the end that no reasonable medical, surgical, hospital or consultative expense is spared to ensure a good end result.

The treatment of injuries or diseases not industrially induced is the function of private medical practice. In his industrial relations, the physician should abstain from such services except for minor ailments (the physician in industry may treat minor physical disorders that temporarily interfere with a worker's comfort or ability to complete a shift, and for the relief of which he may need immediate attention), first aid for urgent sickness (the physician in industry should employ such measures as the emergency dictates in all cases of urgent sickness occurring during working hours on working premises until such time as prompt notification of the family physician or family relieves him of responsibility) and rehabilitation after sickness and injury (the physician in industry can properly assume responsibility for those phases of rehabilitation after disability, industrially induced or otherwise, that progress best under controlled working conditions).

The physician in industry should be a specialist in his field. In addition to a good training and experience in the general practice of medicine and surgery and to good personal qualities, he should possess a knowledge of the detection and control of occupational diseases and be able to locate hazards and to study the earliest symptoms caused by them. He should become experienced in case finding in communicable disease and its control. He should possess a knowledge of administration, which includes industrial relations, because many of his problems are personal as well as medical. He should know job analysis, to assist in the proper placement of new workers and in the rehabilitation and proper placement of the injured, of the worker with arrested tuberculosis and of those handicapped by heart disease, hypertension, arthritis and other chronic diseases. He should have a knowledge of factory laws and records, of compensation laws, of plant sanitation, ventilation and illumination, of accident prevention and safety and of humanitarianism. He should have had special training quite beyond the field of private practice.

War production has placed special emphasis on the factors of fatigue and nutrition for industrial workers. It is known from Britain's experience[5] after Dunkirk that production, through the medium of the twelve-hour day, seven-day week, increased for a short time, but that accidents increased two and a half times. Within two months, production started to fall and absenteeism became general, owing in part to the fatigue or exhaustion of the workers. In 1941, a committee of the House of Commons reported that absenteeism, even during the winter, dropped about 35 per cent when the working day was reduced to eight hours.

Fatigue, in its physiologic and its psychologic aspects, is perhaps the greatest problem facing the physician in industry today. More and more, it will sabotage the output of American industry unless we profit by the experience of our allies, who had to learn the lesson by trial and error.

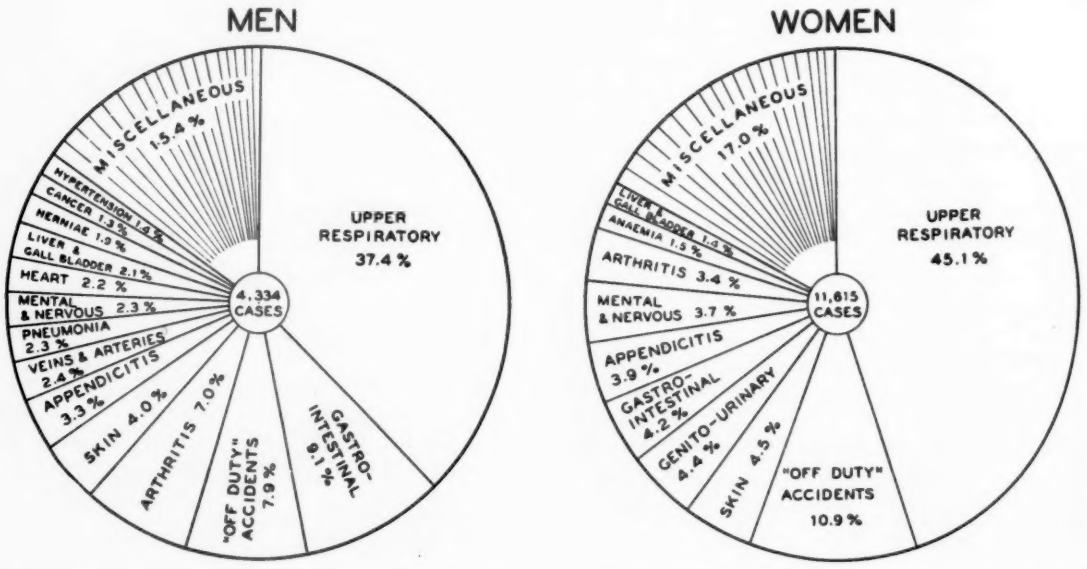


FIGURE 4. *Frequency of Medical Diagnoses, According to Sex, in Illnesses of More Than Seven Days' Duration (1936–1940).*

If all of us, particularly private practitioners, who after all, will continue to treat nearly 85 per cent of all disabilities, industrially induced or

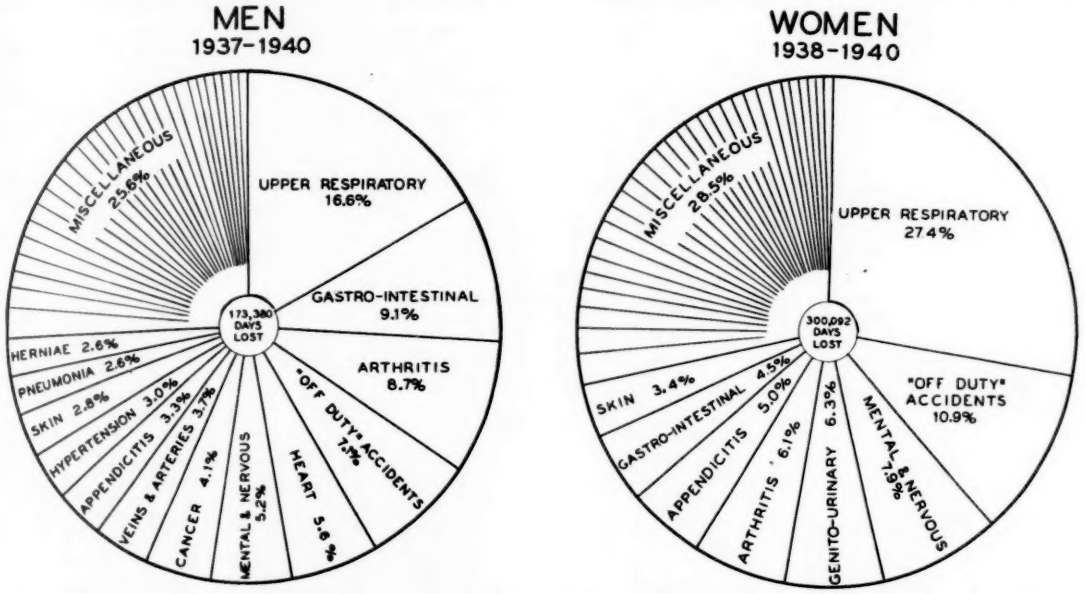


FIGURE 5. *Frequency of Medical Diagnoses, According to Sex, in Severe Illnesses of More Than Seven Days' Duration.*

otherwise, will give serious thought, firstly, to the great need for production to win this war and, secondly, to the reduction of industrial lost time, the need for the seven-day week and the twelve-hour day can be materially reduced. For after all, we, as a people, "can't take it" any better than our British allies: unemployment, the short work-day, the forty-hour week, the machine age, "Beauty-Rest" mattresses and other "take-it-easy" creature comforts have made "softies" out of too many of us. Perhaps, less automobiling and more footwork will make for less coronary-artery fat, disability and death, and for a stronger generation to follow.

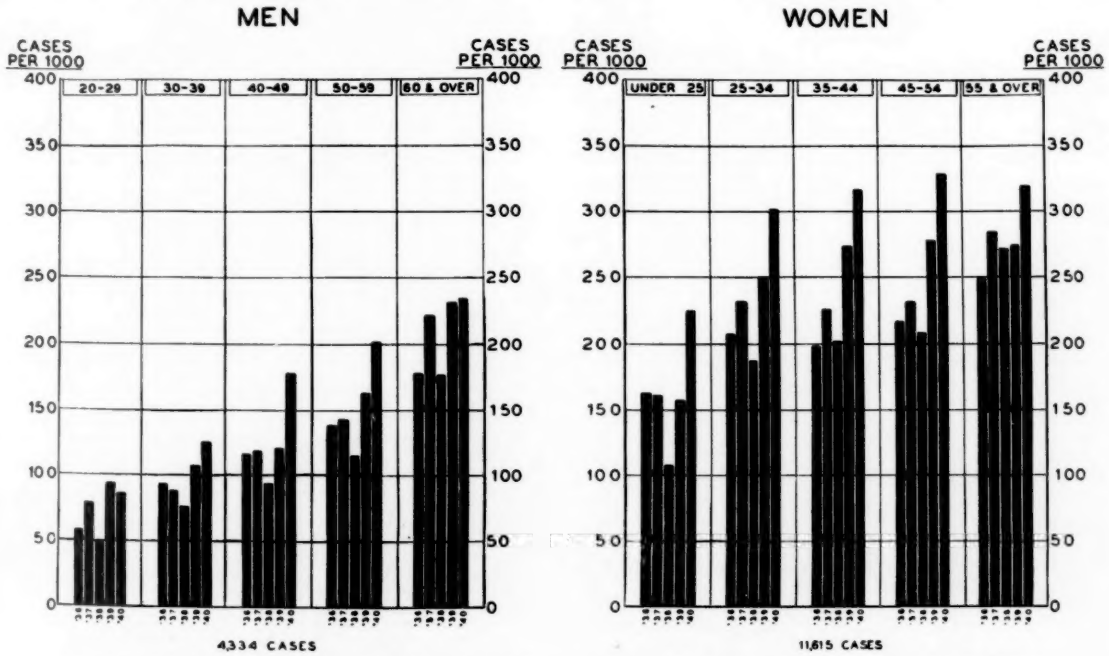


FIGURE 6. *Cases of Sickness Disability, According to Age and Sex, per 1000 Workers (1936–1940).*

Malnutrition is a fifth columnist that erodes our war-workers from within, and works on three eight-hour shifts to produce an industrial slow-

down: insidious and unseen, it may well be an underlying cause of absenteeism, industrial accidents and lowered production. It has been clearly demonstrated that persons on deficient diets soon develop fatigue, mental depression, general weakness and loss of morale. Inadequate facilities for lunch and insufficient time for eating are, at the present time, justifiable causes for dissatisfaction among workers in many plants and on all shifts.

There is just a little more to wartime industrial health, as suggested by Dr. Elton Mayo, of the Harvard Business School. Industry must abandon the philosophy of "take care of the technical situation and let humanity handle itself." It must realize "that sentiment is perhaps more important than logic in dealing with workers; that the men at the bench have feelings other than those expressed in terms of hours and wages, that they need social

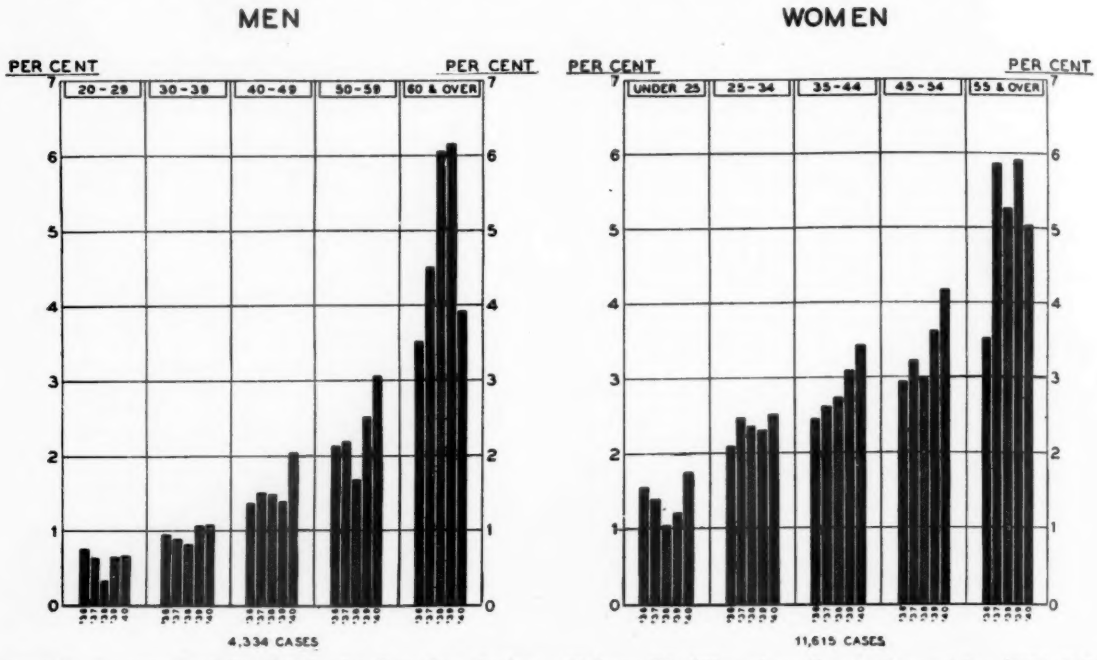


FIGURE 7. *Percentage of Total Calendar Days Lost Owing to Sickness Disability, According to Age and Sex (1936–1940).*

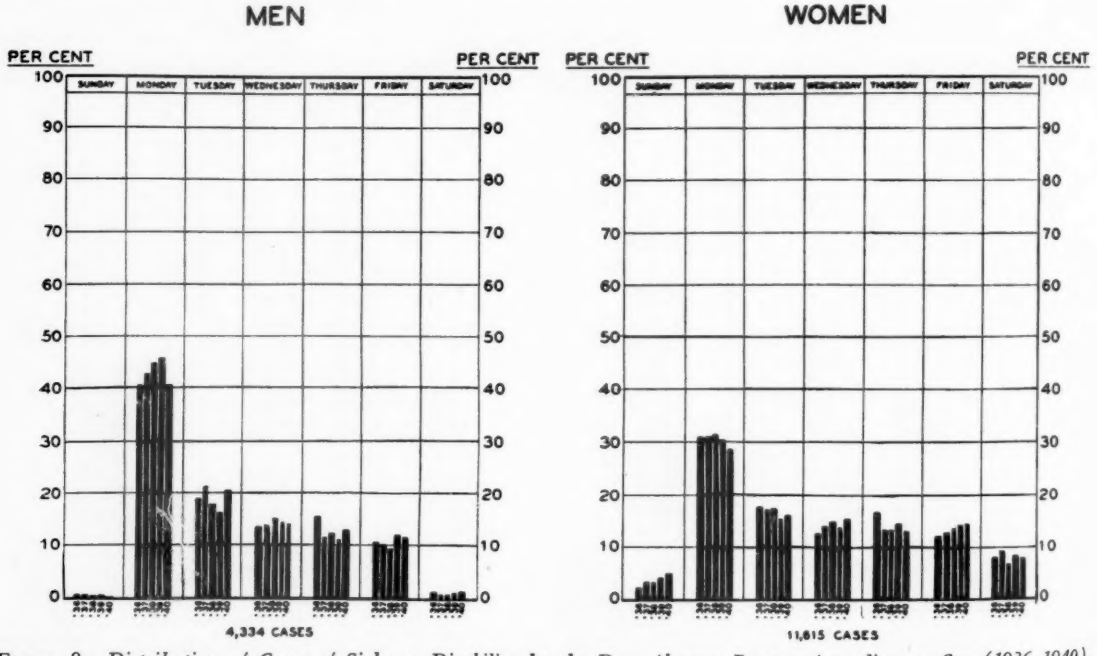


FIGURE 8. *Distribution of Cases of Sickness Disability by the Day Absence Began, According to Sex (1936–1940).*

recognition in the shop quite as much as they need it in the neighborhoods where they live." The maintenance of good mental health and of good morale is extremely vital to the industrial physician. He must continue his efforts to put humanitarianism into war-production activities.

May we, as private physicians and industrial physicians, team up so that production for war may be kept rolling, around the clock!

* * *

Some of the problems of industrial health are illustrated by the accompanying charts, which are based on figures obtained by my department of the New England Telephone and Telegraph Company and from the Consolidated Edison Company, New York City.

Figure 1 shows the distribution of industrial lost time between occupational and nonoccupational accidents and nonoccupational sickness. It should be noted that 86 per cent of 16,648 disability cases were due to nonoccupational sickness that lasted eight days or more, 10 per cent to nonoccupational accidents and only 4 per cent to occupational accidents causing disability for one day or more. Occupational accidents seem to have been well controlled.

Figure 2 shows the frequency of medical diagnoses in illnesses lasting more than two days in a group of 19,500 cases. Upper respiratory infections were responsible for 48.5 per cent of all these cases of disability, and all efforts to better the situation have thus far been futile.

Figure 3 shows the severity of disabilities lasting two or more days in the same group; these layoffs accounted for approximately 155,800 lost days in 1941. Again, upper respiratory infection was responsible for a third of all lost time.

Figure 4 shows the frequency of medical diagnoses among men and women when the absence continued for eight or more days. In both groups, disabilities due to upper respiratory infections caused the highest number of absences, as was true in the short-period absences. Disability due to off-duty accidents formed the second largest group among women, and the third largest group among men.

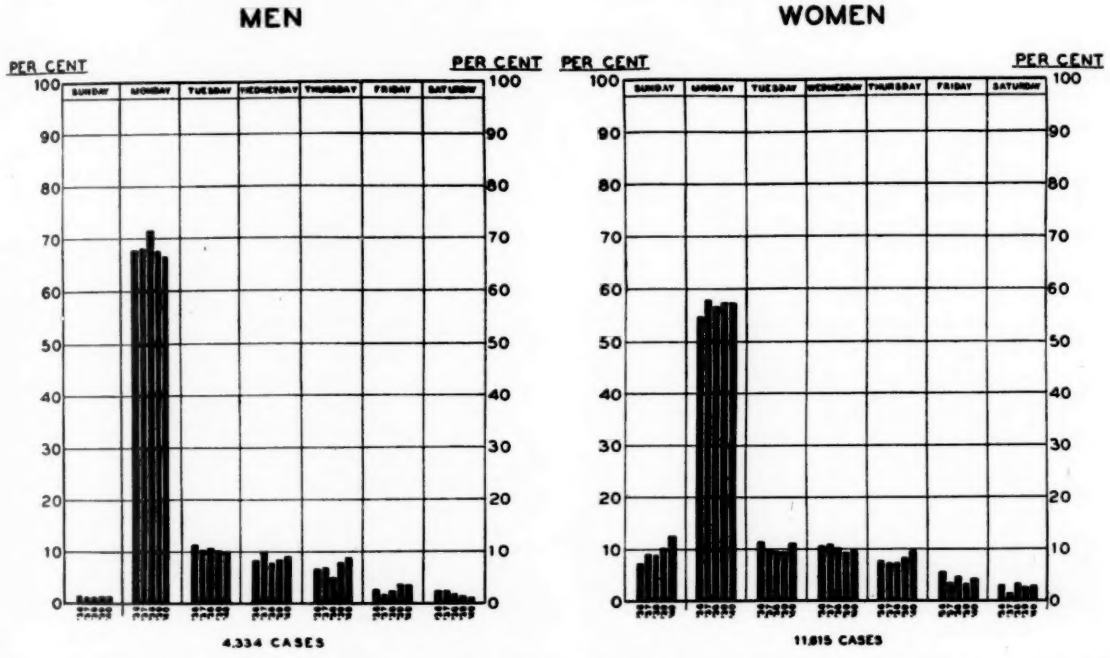


FIGURE 9. *Distribution of Cases of Sickness Disability by the Day the Worker Returned, According to Sex (1936–1940).*

Figure 5 shows the severity of the various types of disabilities. As one would expect, the proportion of all lost time because of upper respiratory infection was less among women and among men than the proportion of actual absences, since disability is shorter in upper respiratory illness. But it should again be noted that off-duty accidents among women caused nearly 11 per cent of 300,000 lost days from work, and that, among men, they caused 7 per cent of 173,000 lost days. In both groups, arthritis caused an appreciable amount of lost time.

Figure 6 is evidence of the increasing frequency of disability for work among men and among women as age increases. In the age group from twenty to twenty-nine, there were roughly 70 cases of disability per 1000 men per year, whereas among men over sixty, approximately 200 cases occurred per 1000 men. Among women, the contrast was

not so great, but there is pictured the upward trend of disability frequency as women advance in age. This increase was consistent from year to year, and it emphasizes the problem of industrial health as it is affected by the older employees.

Figure 7 demonstrates the severity of illness with increasing age; although men under thirty lost only about 0.7 per cent of available work time because of illness, men over 60 lost nearly 5 per cent. The situation was similar among women, the length of their absences increasing with age, regardless of its cause.

Figure 8 is interesting. It shows the frequency with which absences began on the several days of the week. One wonders why such a large proportion of all disabilities began on Monday. It may be that workers did not feel quite up to par at the end of the week, but remained on to finish out the week; or it may mean that a good many of them had a "bad week end."

More interesting, however, is Figure 9, which indicates the day of return to work following disability, regardless of the day on which disability began. Among men, nearly 70 per cent returned to work on Monday, and the same thing was true for nearly 60 per cent of the women. Production must continue on other days of the week, as well as on Monday, and those concerned with production cannot understand why workers who have recovered from illnesses wait until Monday to return to work. To a large extent, it is a psychologic problem — the thought of beginning the week right. Unquestionably, the private physician can help a great deal in this respect: a great deal of lost time can be regained if he will permit and encourage his patients to return to work as soon as they are able.

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## ROBERT BURTON AND HIS DRUGS: THE ARMAMENTARIUM OF 1600*


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IN THE second partition of Robert Burton's *Anatomy of Melancholy*, which appeared in London in 1621 and in which the author dealt with the cure of melancholy, one finds a discussion "of Physick which cureth with medicines, and of medicines purging melancholy and of those curing head melancholy and hypochondriacal or windy melancholy."

Burton was not a physician, but he was a learned man who had read the works of those before him and of his contemporaries, and had sifted out the gist of their recommendations. At that time, the doctrine of the four humors and the temperaments prevailed, and there was no science of anatomy or of physiology for physicians. Vesalius had begun to influence surgery, but internal medicine remained medieval.

Burton began by railing at physic a bit:

> The country people use kitchen physick and common experience tells us they live freest from all manner of infirmities that make least use of apothecaries physick. . . . Some think the physicians kill as many as they save and who can tell how many murders they make a year, *quibus impune licet hominum occidare*, that may freely kill folk and have a reward for it? And, according to the Dutch proverb, a new Physician must have a new Church-yard, and who daily observeth it not?

However, after further such diatribe, he hastened to say: "But I will urge these cavelling and contumelious arguments no farther, lest some physician should mistake me and deny me Physick when I am sick; for my part, I am well persuaded of Physick."

Burton proceeded to single out some of the chief and best recommended drugs of the pharmacopeias and herbals at his disposal. He divided all simple medicines into alteratives and purgatives. It is his list of simples that is considered here. He had comparatively little use for compound formulas or for powdered precious stones, although he devoted a small space to them. The purgative simples were divided into those purging upward (emetics) and those purging downward (cathartics). He also divided the simples as having particular virtues for particular parts of the body:

> As to the head, Aniseeds, Foalfoot, Betony, Calamint, Eyebright, Lavender, Bays, Roses, Rue, Sage, Marjorum, Peony, etc.; for the lungs, Calamint, Liquorice, Enula


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Campana, Hyssop, Horehound, Water Germander, etc., for the heart, Borage, Bugloss, Saffron, Balm, Basil, Rosemary, Violet, Roses, etc.; for the stomach, Wormwood, Mints, Betony, Balm, Centaury, Sorel, Purslain; for the liver, Darthspine, Germander, Agrimony, Fennel, Endive, Succory, Liverwort, Barberries; for the spleen, Maidenhair, Finger-fern, Dodder of Thyme, Hop, the rind of Ash, Betony; for the Kidnies, Grumel, Parsley, Saxifrage, Plantain, Mallow; for the womb, Mugwort, Pennyroyal, Fetherfew, Savine, etc.; for the joints, Camomile, St. John's Wort, Organ, Rue, Cowslips, Centaury the less, etc.

How many of Burton's drugs have persisted through the ages? How many were official in the pharmacopeia and formularies as late as the turn of the twentieth century? I have made a list, finding for Burton's old common names the Latin names of his galenicals, and then determined whether they were in the *U. S. Pharmacopoeia VII* (1894) and whether they are still in the *U. S. Pharmacopoeia XI* (1936) or in the *National Formulary V* (1926) or *VI* (1936). I also consulted certain editions (1914, 1926 and 1932) of the *British Pharmacopoeia*. Furthermore, by referring to the 1894 edition of the *U. S. Dispensatory*, as well as the 1938 edition, I ascertained whether the drugs that were not in the official and semiofficial lists chanced to be mentioned in Part II of these dispensatories. The citation of Burton's drugs in Table 1 may not be complete, but the one hundred and thirty-eight items given suffice to demonstrate how Burton's drugs have withstood the centuries.

TABLE 1. *Burton's Drugs and Their Survival to Modern Times.*

| LATIN NAME | BURTON'S NAME | MODERN NAME (IF DIFFERENT) | BURTON'S THERAPEUTICS | MODERN THERAPEUTICS |
|---|---|---|---|---|
| *Acorus calamus* | Calamus aromaticus | Sweet flag | For flatulence | *USP* 1894; *NF* 1936: aromatic; for flatulence. |
| *Adiantum capillis veneris* | Maidenhair | | For the spleen | *Disp.* 1938: pectoral |
| *Agremonia eupatorium* | Agrimony | | For the liver | *Disp.* 1938: astringent; tonic. |
| *Ajuga chamaepitys* | Darthspine | Ground pine | Diuretic; for the liver. | *Disp.* 1938: diuretic |
| *Aloe Perryi* | Aloes | Socotrine aloe | Purge | *USP* 1936: cathartic |
| Ambergris | Ambergris | | For flatulence | *Disp.* 1938: antispasmodic |
| *Ammi visnaga* | Ammi | Bishop's weed | For flatulence | *Disp.* 1938: stomachic |
| Ammonium chloridum | Ammoniac | Ammonium chloride | Mild purge | *USP* 1936: saline; expectorant. |
| *Amomum melegueta* | Grana paradisi | | For flatulence | *Disp.* 1938: stomachic; spice. |
| *Anacyclus pyrethrum* | Pellitory | | Masticatory | *USP* 1894: rubifacient; sialogogue. |
| *Anchusa officinalis* | Bugloss | | For melancholy; for the heart. | *Disp.* 1938: stomachic; diuretic. |
| *Anethum graveolens* | Dill | | Diuretic | *B.P.* 1926: diuretic |
| *Angelica archangelica* | Angelica | | For flatulence | *Disp.* 1938: stomachic |
| *Anthemis nobilis* | Camomile | | For the joints; for flatulence. | *USP* 1894; *BP* 1926: stomachic |
| Antimonium sulfidum | Antimony | Antimony sulfide | Emetic | *BP* 1926: emetic |
| *Aristolochia rotunda* | *Aristolochy* | Somerwort | For flatulence | *Disp.* 1938: tonic |
| *Artemesia abrotanum* | Southernwood | | For baths | *Disp.* 1938: mentioned |
| *Artemesia absynthium* | Wormwood | Absinthe | For the stomach | *Disp.* 1938: stomachic |
| *Artemesia vulgaris* | Mugwort | | For melancholy; for the uterus; for the spleen. | *Disp.* 1938: ecbolic |
| *Arum maculatum* | Dragon's root | Cuckoo's pint | Mild purge | *Disp.* 1938: expectorant |
| *Asarum europeum* | Assarabacca; foal's foot. | Asarum | Emetic; for the head; diuretic. | *Disp.* 1938: emetic; errhine. |
| *Asplenium ceterach* | Ceterach; finger fern. | | For the spleen | *Disp.* 1938: other *Asplenia* mentioned; probably anthelmintic. |
| *Atropa mandragora* | Mandrake | | For sleep | *Disp.* 1938: depressant (atropine and mandragorine) |
| *Berberis vulgaris* | Barberry | | For the liver | *BP* 1914; *NF* 1936: astringent; cathartic. |
| *Betonica officinalis* | Betony | | For the head; for the stomach; for the spleen. | *Disp.* 1938: aromatic; astringent. |
| *Borago officinalis* | Borage | | For the head; for the heart. | *Disp.* 1938: demulcent |
| *Brassica nigra* | Mustard | | For flatulence | *USP* 1936: condiment; emetic. |
| *Coffea arabica* | Coffee | | For the head | *NF* 1926: stimulant; flavor. |
| *Calendula officinalis* | Marigold | | For melancholy | *USP* 1894; *NF* 1936: antispasmodic |
| *Cannabis sativa* | Hemp; bang. | Indian hemp | For sleep | *BP* 1926; *NF* 1936: hypnotic |
| *Carum carvi* | Cary | Caraway | For flatulence | *USP* 1936: stomachic |
| *Caryophyllus aromaticus* | Clove | | For flatulence | *USP* 1936: carminative |
| *Cassia fistulosa* | Cassia | | Purge | *USP* 1894; *BP* 1932; *NF* 1926: purgative |
| *Cassia senna* | Senna | | Purge | *USP* 1936: purgative |
| Castor | Castor | Glands of beaver | For melancholy; errhine. | *Disp.* 1938: antispasmodic |
| *Chicorium endiva* | Endive | | For the stomach | *Disp.* 1938: mentioned |
| *Chicorium intybus* | Chicory; succory | | For melancholy | *Disp.* 1938: reputed tonic; in jaundice. |
| *Cnisus benedictus* | Carduus benedictus | Thistle | Emetic | *Disp.* 1938: emetic |
| *Colchicum autumnale* | Hemodactyls | Colchicum | Purge | *USP* 1936: in gout; palliative. |
| *Colutea arborescens* | Colutea | Bladder senna | Mild purge | *Disp.* 1938: purgative |
| *Combretaceae: Terminalis* (5 species) | Myrobalans | | Purge | *Disp.* 1894: astringent; cathartic. |
| *Convulvus scammonium* | Scammony | | Purge (by suppository) | *Disp.* 1938: purge (Mexican scammony, an *Ipomoea*, in *NF* 1936) |

TABLE 1 (*Continued*)

| LATIN NAME | BURTON'S NAME | MODERN NAME (IF DIFFERENT) | BURTON'S THERAPEUTICS | MODERN THERAPEUTICS |
|---|---|---|---|---|
| *Crocus sativa* | Saffron | | Soporific; for the heart. | *USP* 1894; *NF* 1936: coloring matter. |
| *Curcuma zedoaria* | Zedoary | | For flatulence | *NF* 1926: aromatic; for flatulence. |
| *Cuscuta epithymum* | Epithyme; dodder of thyme. | | For the spleen | |
| *Cuscuta europoea* | Dodder | | Mild purge | |
| *Cyclamen hederaefolium* | Ciclimen | Sow bread | For flatulence; purge. | *Disp.* 1938: purgative |
| *Datura stramonium* | Datura stramonium | Thorn apple; jimson weed. | For melancholy | *USP* 1936: nerve depressant |
| *Daucus carota* | Daucus | Carrot seed | Diuretic | *Disp.* 1938: diuretic |
| *Dictamus albus* | Dittany | | Purge of melancholy | *Disp.* 1894: sedative in hysteria |
| *Drosera ros solis* | Ros solis | Sundew | For melancholy | *Disp.* 1938: other *Drosera* cited as inert |
| *Electuarium lentivum* | Confection of senna | | Lenitive; purge. | *USP* 1894; *BP* 1932: mild purgative |
| *Elettaria repens* | Carduans | Cardamom | For melancholy; for flatulence. | *USP* 1936: aromatic; carminative; flavor. |
| *Eruca sativa* | Rocket | | Aphrodisiac | |
| *Erythraea centaureum* | Centaury | | Mild purge | *Disp.* 1938: tonic; laxative. |
| *Euphorbia lathyris* | Caper | Caper; spurge. | Purge | *Disp.* 1938: diuretic; oil, a cathartic. |
| *Euphrasia officinalis* | Eyebright | | For the head | *Disp.* 1938: reputed for toothache, eyes and catarrh |
| *Foeniculum vulgare* | Fennel | | For the liver; diuretic. | *USP* 1894; *NF* 1938 (oil); *USP* 1936: aromatic; carminative. |
| *Fraxinus excelsior* | Rind of ash | Ash bark | For the spleen | *USP* 1894: for rheumatism and gout |
| *Fraxinus ornus* | Manna | | Purge | *USP* 1894; *NF* 1936: gentle laxative |
| *Fumaria officinalis* | Fumitory | | Purge | *Disp.* 1938: tonic; laxative. |
| *Genista tinctoria* | Genist | Broom; dyer's broom. | For flatulence | *Disp.* 1938: purgative |
| *Globularia alypum* | Alypus | Wild senna of Europe | Purge; for flatulence. | *Disp.* 1938: mild purgative |
| *Glycyrrhiza glabra* | Liquorice | | For the lungs | *USP* 1936: flavor; demulcent. |
| Guaiacum | Guiacum | | For melancholy | *NF* 1936: nauseant; purgative. |
| *Helleborus niger* | Black hellebore | | Drastic purge | *Disp.* 1938: emetic; cathartic; cardiac. |
| *Hepatica triloba* | Liverwort | Hepatica | For the liver | *Disp.* 1894: tonic; astringent; demulcent. |
| *Humulus lupulus* | Lupulus | Hops | For the spleen; for the blood; for melancholy. | *USP* 1890; *NF* 1936: tonic; bitters. |
| *Hypericum perforatum* | St. John's wort | | For melancholy; for the joints. | *Disp.* 1938: reputed in hysteria and mania |
| *Hyssopus officinalis* | Hyssop | | For the lungs: for flatulence. | *Disp.* 1938: carminative; expectorant. |
| *Inula helenium* | Enula campana | Elecampane | For flatulence | *USP* 1894: expectorant |
| *Juniperus sabina* | Juniper berries; sabine. | | For the uterus; for flatulence. | *USP* 1936 (oil): carminative; diuretic. |
| *Ipomoea turpenthum* | Turbeth | Turpenth | Purge | *BP* 1932: purge (jalap group) |
| *Lactuca sativa* | Lettuce | | Sedative | *Disp.* 1938: inert |
| Lapis Armenum | Armenian stone | | Simple purge | *Disp.* 1894: Armenian bole mentioned as an antacid |
| Lapis lazuli | Lapis lazuli | | Purge | Lazurite contains sodium sulfide and aluminum silicate |
| *Laurus nobilis* | Laurel or bay | European laurel | Emetic | *Disp.* 1938: spice; stomachic. |
| *Lavendula vera* | Lavendar | | For the head | *USP* 1936 (oil): aromatic; stimulant; flavor. |
| *Lavendula stoechas* | Stoechas | | Mild purge of melancholy | *Disp.* 1894: tonic; stomachic. |
| *Lithospermum officinale* | Grumel | Gromwell | For the kidneys | *Disp.* 1938: reputed diuretic |
| *Malva sylvestris* | Mallows | | For the kidneys | *Disp.* 1938: demulcent; sometimes used in kidney disease. |
| *Maranta galanga* | Galanga or China root | | For flatulence | *Disp.* 1938: stimulant; aromatic. |
| *Marrubium vulgare* | Horehound | | For the lungs | *USP* 1894: tonic; laxative; for cough. |
| *Melissa officinalis* | Balm | | For the head; for the heart. | *USP* 1894: diaphoretic; antispasmodic. |
| *Mentha pulegonium* | Pennyroyal | | For the uterus: for flatulence. | *Disp.* 1938: stomachic; abortifacient. |
| *Mercurialis annua* | Mercury herb | | Purge | *Disp.* 1938: diuretic |
| *Myristica fragrans* | Nutmeg | | Soporific; for flatulence. | *USP* 1936: aromatic; flavor; sedative; ecbolic. |
| *Nicotiana tabacum* | Tobacco | | Emetic | *USP* 1894: emetic |
| *Nymphea odorata* | Water lily | | Soporific; anaphrodisiac. | *Disp.* 1938: reputed anaphrodisiac |
| *Ocimum basilicum* | Ocyme or basil | | For the heart | *Disp.* 1938: aromatic; condiment; demulcent. |
| *Origanum vulgare* | Origan or marjoram | | For the joints; for flatulence; for the head. | *Disp.* 1938: tonic; condiment: stomachic. |
| *Paeonia officinalis* | Peony | | For melancholy; for the head. | *USP* 1894: antispasmodic; in epilepsy. |
| *Papaver somniferum* | Poppy | Opium | Soporific | *USP* 1936: narcotic |
| *Petroselinum hortense* | Parsley | | For the kidneys | *USP* 1894: ecbolic; antipyretic. |
| *Pimenta officinalis* | Allspice | | For flatulence | *USP* 1894; *NF* 1936: carminative |
| *Pimpinella anisum* | Anise seed | | For flatulence; diuretic. | *NF* 1936 (oil): carminative; flavor. |
| *Piper nigrum* | Pepper | | Errhine | *USP* 1894; *NF* 1936: carminative; sternutatory. |
| *Plantago major* | Plantin | Plantain | For the kidneys | *Disp.* 1938: diuretic (Psyllium seed, *NF* 1938, purgative) |
| *Polypodium vulgare* | Polypody | Polypody fern; rock brake. | Purge | *Disp.* 1938: pectoral; demulcent; purgative; anthelmintic? |
| *Polyporus officinalis* | Agaric | Agaric mushroom | Purge | *Disp.* 1894: anciently reputed in consumption |
| *Portulacca oleracea* | Purslain | | For melancholy | *Disp.* 1938: diuretic? |

TABLE 1 (*Concluded*)

| LATIN NAME | BURTON'S NAME | MODERN NAME (IF DIFFERENT) | BURTON'S THERAPEUTICS | MODERN THERAPEUTICS |
|---|---|---|---|---|
| *Primula officinalis* | Primrose; cowslip. | | | *Disp.* 1938: mentioned |
| *Pyrethrum (Chrysanthemum) parthenium* | Fetherfew; feverfew. | | For the uterus | *Disp.* 1938: action like camomile |
| *Rheum officinalis* | Rhubarb | | Purge | *USP* 1936: purgative |
| *Rosa centrifolia* | Rose | | For the head | *USP* 1894; *NF* 1936 (*Rosa gallica*): astringent; tonic. |
| *Rosmarinus officinalis* | Rosemary | | For flatulence | *USP* 1936 (oil): aromatic; stimulant. |
| *Rumex acetosa* | Sorrel | Dock | For the stomach | *Disp.* 1938: astringent, diuretic. |
| *Ruta graveolens* | Rue | | For flatulence | *Disp.* 1938: astringent; diuretic. |
| *Salex alba* | Willow | | For sleep | *Disp.* 1926: contains salicin |
| *Salvia officinalis* | Sage | | For flatulence; for the head. | *NF* 1936: astringent; aromatic; flavor. |
| *Santalum album* | Sanders | Sandalwood | For melancholy | *USP* 1894; *NF* 1936: expectorant; aromatic. |
| *Sassafras variifolium* | Sassefras | Sassafras | For flatulence | *USP* 1936 (oil): aromatic; carminative; flavor. |
| *Saturega hortense* | Calamint | | For the head; for the lungs. | *Disp.* 1938: mentioned |
| *Satyrium* | Satyrion | An orchid | For the head | |
| *Saxifrage cordifolia* | Saxifrage | | For the kidneys | *Disp.* 1938: a bitter |
| *Scolopendrium vulgare* | Scolopendria | | For the spleen | *Disp.* 1894: astringent; demulcent. |
| *Scorzonera hispanica* | Scorzonera | Black salsify | For melancholy | |
| *Smilax china* | China | China root | For melancholy | *Disp.* 1938: diuretic |
| *Smilax officinalis* | Sarsaparilla | | For melancholy | *USP* 1936: diuretic; for syphilis. |
| Sodii nitras | Saltpeter | Sodium nitrate | Purge | *USP* 1926: saline cathartic; diuretic. |
| *Solanum dulcamara* | Solanum | Nightshade | For sleep | *NF* 1926: sedative |
| *Sonchus oleraceus* | Sow thistle | | For the blood | *Disp.* 1938: cathartic |
| *Tamarix gallica* | Tamarisk | Larch | For the spleen | *BP* 1914: astringent; expectorant. |
| *Taraxicum officinale* | Dandelion | | For the blood; for melancholy. | *USP* 1894; *NF* 1936: bitter; stomachic. |
| *Terebinthina* | Cyprian turpentine | Turpentine | For flatulence | *NF* 1936: not recommended internally |
| *Teucreum chamaedrys* | Germander | | For the lungs | *Disp.* 1938: coroborant |
| *Teucreum scordium* | Scordium | Water germander | For the lungs | *Disp.* 1938: coroborant |
| *Thymus vulgaris* | Thyme | | Preparative | *NF* 1936 (oil): pectoral |
| *Urginea Maratima* | Scilla; sea onion. | Squills | Emetic | *USP* 1936: emetic; cardiac. |
| *Urtica dioica* | Nettle seed | | For flatulence | *Disp.* 1938: diuretic |
| *Valeriana jatamansi* | Spiknard (oil) | | For flatulence | *Disp.* 1894: expectorant |
| *Valeriana officinalis* | Valerian | | For flatulence | *USP* 1936: sedative of smooth muscle |
| *Veratrum album* | White hellebore | | Emetic; errhine. | *Disp.* 1938: emetic, cardiac (*V. viride* in *USP* 1936) |
| *Verbascum thapsis* | Verbasca | Mullen | | *NF* 1926: demulcent |
| *Vitex agnus castus* | Agnus castus | | For flatulence | King's *Am. Disp.* 1898: anaphrodisiac |
| *Viola odorata* | Violet | | For the heart | *Disp.* 1938: demulcent; laxative; emetic. |
| *Zingiber officinalis* | Ginger | | For flatulence | *USP* 1936: aromatic; spice. |

One concludes from the above list that, of the one hundred and thirty-eight drugs, fifty-eight were still official or semiofficial in 1890, whereas fifty of these have persisted to the present decade. Of the rest, all but about six are described as drugs in a modern source, the *Dispensatory*.

Burton lived just before the influx of drugs from the Americas, when such important items as quinine and ipecac arrived — long before Withering and his digitalis, and longer still before Claude Bernard and the beginning of experimental medicine. But, for Burton's day, this was a sane list, amid many semimagical offerings. True, he mentions one author who praises the virtue of taking one hundred and one eggs, three at a time, but with the knowledge of vitamins today, eggs in such large "doses" might have some therapeutic effect. He mentions the virtue, at seasonable times, of being seasick.

It seems remarkable that there existed therapeutic nihilism, too, before his time, for Burton quotes an author (Girolamo Cardan, 1501–1576) who could "cure all diseases with water alone." Does that not sound like the present school whose dictum is "rest and forced fluids"?

No wonder Burton spurned compound formulas, the "dia-this" and "dia-that," the confections, the electuaries, the theriaca (treacles) and the mithridates. The following is the formula* of the

| ℞ | Gm. vel cc. |
|---|---|
| Troschique of squills | 360 |
| Troschique of the bodies of vipers | 180 |
| Hedycroon | |
| Long peppers | |
| Thebacic opium | āā 180 |
| Red roses | |
| Dried glycyrrhiza | |
| Turnip seed | |
| Water germander | |
| Balm of Gilead | |
| Cinnamon | |
| Agaric | āā 90 |
| Costus root | |
| Indian nard | |
| Dictamus of Crete | |
| Rhapontic | |
| Cinquefoil root | |
| Ginger | |
| White marrubium | |
| Arabic stoechas | |
| Flowers of fragrant jonquils | |
| Macedonian parsley seed | |

*This is taken from the second edition of a French work, *Pharmacopée Royale Galenique et Chymique* (Lyons, 1753), by Moyse Charas, and is one of the traditional formulas for this medicament. The first edition of Charas's work was issued in Paris in 1676, and thus may have been seen by Burton. The formula made 40 pounds, but the pharmacist doubtless did not set about making up this item too often.

| | | |
|---|---|---|
| Mountain calamint | | |
| Aromatic coffee | | |
| Saffron | | |
| Black and white pepper | | |
| Triglodite myrrh | | |
| Frankincense | | |
| Chian turpentine | āā | 45 |
| Gentian root | | |
| True acorus | | |
| Spignel | | |
| Great valerian | | |
| Celtic nard | | |
| Cardamoms | | |
| Ground pine | | |
| St. John's wort | | |
| Ammi seed | | |
| Thalaspi seed | | |
| Anise seed | | |
| Fennel seed | | |
| Hartwort of Marseilles | | |
| Little cardamoms | | |
| Malabathrum | | |
| Tufts of *Polii montani* | | |
| Germander | | |
| Carpobalsam | | |
| Juice of hypocists | | |
| True acacia | | |
| Gum arabic | | |
| Calamite storax | | |
| Lemnian earth | | |
| Chalcite | | |
| Sagapenum | āā | 30 |
| Little aristolochia root | | |
| Little centaury points | | |
| Cretian wild carrot seed | | |
| Opopanax | | |
| Galbanum | | |
| Judean pitch | | |
| Castor | āā | 15 |
| Good honey | | 12,684 |
| Good wine | *q.s.* | |

Make a treacle according to the art.

*Sig:* Take one teaspoonful at bedtime, followed by a glass of wine. Two teaspoonfuls may be taken if necessary.

"Theriaca of the Elder Andromanchus," originally in Latin, which has been translated into English and the metric system.

The indications were paralysis, apoplexy, epilepsy, lethargy, convulsions, diarrhea and dysentery, as a vermifuge, as an antidote to poisons, for malaria and pest smallpox, against the bites of mad dogs and snakes, for insomnia, for hysteria, for icterus and for "infinite other maladies." Each 75 gr. was stated to contain 1 gr. of opium. Hence, a teaspoonful would give about 0.06 gm. opium, or a full adult dose.

One did not in those days compound such a treacle in the amount of a single prescription. One can think of the assistants pounding mortars for days before the assembly of the mixture.

Accordingly, Burton did not hold theriacas in repute, and it can be seen why. He preached moderation. And, strangely enough, in therapeutics, he found authority for this in the writings of Arnold of Villanova, who lived from 1235–1312. Burton quotes Arnold as follows:

> And this no other which I say than that which Arnoldus prescribes in his 8 Aphoris: *A discreet and godly Physician doth first endeavor to expel a disease by medicinal diet, then by pure medicine,* and in his 9th: *he that may be cured by diet must not meddle with Physick.* So in Aphoris 11: *A modest and wise Physician will never hasten to use medicines, but upon urgent necessity, and that sparingly too.*

Can those who today teach pharmacology and therapeutics think of a better tag for the end of their course of lectures, a better *envoi* to the students, than these words of Arnold's from the year 1300?

# MEDICAL PROGRESS

## NUTRITION: THE APPEARANCE OF THE TONGUE AS AN INDEX OF NUTRITIONAL DEFICIENCY*

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THE old-time practitioner paid considerable attention to the appearance of the patient's tongue; much helpful information was undoubtedly secured. It is the purpose of this review to point out that the modern physician can use this simple clinical observation to a much better advantage than his predecessor.

In his recent monograph, Thoma[1] states, "The tongue is probably a better indicator of somatic disturbances than any other part of the oral mucosa." The literature of the last ten years indicates this to be especially true for the various nutritional deficiency disorders. To clarify this aspect of the subject, it is necessary to review briefly the anatomy of the tongue and the lingual manifestations of systemic disorders, as well as primary lingual diseases that may be confused with the manifestations produced by the nutritional deficiencies.

### *Diagnostic Importance of Tongue In General Practice*

Changes in the tongue are numerous and reflect, or are actually diagnostic of, many systemic disorders other than nutritional deficiencies. Means,[2] Comroe[3] and Kennedy[4] have briefly discussed some of these. The monographs by Prinz and Greenbaum[5] and Thoma[6] do so in greater detail and include many colored plates of representative lesions. A study of these plates is helpful, since the color of lingual lesions is often of prime value in diagnosis and yet very difficult to visualize from a written description. The tongue reflects the degree of jaundice, pallor or cyanosis, at times of pigmentation and more rarely of purpura. Changes in taste or in movement and the onset of paralysis or tremors are of value in neurologic diagnosis. The tongue is enlarged in cretinism, myxedema, mongolism, acromegaly, angioneurotic edema, infectious glossitis and so forth. Rarely, one may see the Lubarsch-Pick syndrome (systematized amyloidosis with macroglossia).[7] The Liebermeister syndrome is diagnostic of air embolism.[8] A number of dermatologic conditions have associated lingual lesions, as do certain of the blood dyscrasias, drug eruptions and uremia. Dameshek and Henstell[9] have emphasized the characteristic appearance of the tongue in polycythemia vera. McCarthy,[10] Comroe[3] and Brown and Haffner[11] have discussed some of the commoner disorders localized in or peculiar to the tongue. These include leukoplakia, cancer, chancre, tertiary syphilis, lingual thyroid, benign tumors, traumatic ulcers, glossitis rhomboidea mediana and so forth. These conditions, even though numerous and varied, are usually distinctive in appearance and can be readily differentiated from the lingual changes due to nutritional deficiencies. The latter are discussed in detail elsewhere in this paper.

Simple inspection with the naked eye or with an ordinary magnifying glass (2 or 3x) gives all the information required. Trueblood[12] advises that the tongue be palpated with the gloved fingers. This procedure, by evaluating the degree of induration, is helpful in diagnosing cancer, chancre and so forth, but is not required to detect the changes caused by the deficiency states. Glossitis and other lingual changes should be differentiated from buccal mucositis,‡ gingivitis and cheilitis.

### *Anatomy of Tongue*

The ability of the tongue to reflect so many systemic changes is inherent in the unique histologic structure of the dorsum of the tongue anterior to the V-shaped groove, the sulcus terminalis of His, which separates the anterior from the posterior portion or root. The undersurface of the tongue is covered by thin, smooth mucous membrane identical in structure, appearance and color with the rest of the buccal mucosa. The mucous membrane of the posterior dorsum of the tongue is thick, freely movable and of clinical interest only because of the numerous lymphoid follicles (lingual tonsil) present there.[14]

Reprints of articles in this series are not available for distribution, but the articles will be published in book form. The current volume is *Medical Progress: Annual, Vol. III, 1942* (Springfield, Illinois: Charles C Thomas Company, 1942. $5.00).

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‡The term, "stomatitis," is commonly used in the literature to include involvement of the mucous membrane of the tongue, buccal mucosa, mucosa of the palate, gums and lips in a process resulting from irritation, infection or deficiency. The epithelium of the buccal mucosa, palate and undersurface of the tongue is different from that of the dorsum of the tongue. One may be involved without the other and certainly may differ in its response to the same exciting pathologic agent. Since there is no suitable term (comparable to glossitis for the dorsum of the tongue) to signify involvement of the mucous membrane of the buccal mucosa, palate and undersurface of the tongue, Weisberger[13] suggests buccal mucositis as an appropriate term. Gingivitis (for the gums) and cheilitis (for the lips) are, of course, well understood.

The anterior dorsal covering of the tongue is adherent to the muscular tissue and consists of a corium or mucosa rich in vessels, nerves and lymphatics covered by stratified squamous epithelium, similar to but thinner than the skin, arranged for the most part as numerous papillae. There are eight to twelve large, round, circumvallate papillae arranged in a V just anterior to the sulcus terminalis. Most of the anterior dorsum is covered with numerous filiform papillae, thin, barblike squamous epithelial projections. They hide the underlying vascular mucosa and, being relatively opaque squamous cells (similar in a lesser capacity to those that make the skin appear white), give the tongue its normal whitish-pink color in contrast to the red color of the lips and buccal mucosa. There is a continual regeneration and shedding of the squamous epithelium of these papillae similar to the squamous cells of the skin.

The fungiform papillae appear as rounded bright-red eminences among the whitish-pink filiform barbs, larger but much fewer and sparser on the dorsum than at the tip and edge of the tongue. The fungiform papillae appear red because the capillary-containing mucosal portion is covered by only a thin layer of epithelium in contrast to the thicker epithelial layer of the filiform papillae. The epithelium of the filiform papillae appears sensitive to many metabolic changes; it may proliferate more rapidly, making each papilla appear whiter and thicker, or desquamate more readily, exposing the underlying mucosa. The latter condition gives the tongue a smooth red appearance and renders the red fungiform papillae more prominent. The epithelium of the fungiform papillae is more resistant to such changes. The circumvallate papillae are affected least of all.

### *Dry Tongue*

Means[2] has stressed the fact that dryness of the tongue is "the best clinical index of the state of hydration of the body," especially if oliguria, with urine of high specific gravity, is a concomitant finding. The simplicity of lingual inspection makes this a most valuable bedside observation. Mouth breathing, although likely to dry the surface, does not give the tongue the dry, shriveled appearance of a true dehydration. Gregersen and Bullock's[15] demonstration of a close correlation between the volume of the plasma and the flow of saliva appears to give scientific support to the above clinical axiom. Kirk,[16] on the other hand, was unable to correlate the plasma chloride concentration or the degree of dehydration with the condition of the tongue. He believes that dryness of the tongue is better correlated with the degree of intestinal motor paralysis.

The problem is further complicated by the repeated observation that dryness of the tongue often accompanies glossitis, especially that due to deficiency of nicotinic acid[17] and probably from other factors of the vitamin B complex as well. The tongue becomes moist again following appropriate vitamin therapy. Invariably, such persons have atrophic glossitis. Although the mechanism is not clear, it appears that one may expect to see dryness of the tongue in deficient vitamin states as well as in dehydration. Nicotinic acid has been reported as a successful remedy for xerostomia—a condition characterized by chronic dry mouth.[18]

### *Coated Tongue*

The coated tongue has probably occasioned more concern in the layman's mind than in medical circles. Interpreted in the light of modern knowledge, the coat on the tongue may have diagnostic and prognostic significance with relation to the deficiency disorders. Essentially, the coat on a tongue consists of increase and thickening of the desquamating squamous epithelium of the filiform papillae, in addition to mucin, food debris, mouth organisms and leukocytic exudate caught on or between the filiform barbs. The color is white, but may be changed by tobacco, coffee, food or medicinal substances and so forth, since the desquamating epithelium is more readily stained than other cells. A slight coat on the tongue is a common normal finding, especially on the less mobile posterior portion. Failure of the self-cleansing mechanism of normal mastication and salivation causes it to increase. Indeed, a unilateral coating may be noted when half the tongue is immobilized by paralysis.[4] When dehydration is severe, the coating may become dried and matted together, giving the *encrusted tongue*.

Rhoads[19] believes that, in some cases at least, the old-fashioned coated or furred tongue represents beginning necrosis of the filiform papillae. As the condition progresses, the coating becomes more marked until finally the epithelium of the papillae desquamates, leaving the typical slick, red atrophic surface of a vitamin B complex deficiency glossitis. It is a well-confirmed observation that a coated tongue is rarely seen in any of the forms of atrophic glossitis. When therapy is given, the papillae grow in again. The return of a normal surface makes a coating again possible. In other words, the integrity of the papillae is necessary for a coat on the tongue. An increase in the coating may indicate an early deficiency state, and a smooth tongue, with the absence of any coating, an advanced deficiency condition.

A noticeable coat on the tongue is common in many infectious diseases, probably most notably in

scarlet fever. Within forty-eight hours in this disease, the engorged and enlarged red fungiform papillae protrude above a thick white lingual coat caused by hypertrophy and increased desquamation of the filiform papillae to give the characteristic *strawberry tongue*. Then follows desquamation of the white filiform barbs, revealing a smooth, somewhat granular purplish-red lingual mucosa — the typical *raspberry tongue*. The resemblance of this raspberry tongue to the magenta glossitis of ariboflavinosis has aroused comment, but proof of this etiology is lacking. Within a week or more, the papillae of the scarlet-fever tongue regenerate, with return of the normal lingual appearance.

One may speculate on the possibility that infectious diseases influence the lingual papillae by interfering with proper metabolism of the various factors of the vitamin B complex. The lingual coat in scarlet fever may be more striking than in other infectious diseases because the enanthem operates in addition to the mechanism just mentioned. Resolution of this problem may prove to be a fruitful bit of research.

Oatway and Middleton[20] found a correlation of coated tongue with the degree of gastric acidity. Of 55 patients with coated tongues, 11 had achlorhydria, 2 hypochlorhydria, 17 hyperchlorhydria, and 25 normal acidity.

*Pellagrous Glossitis*

Spies and Cooper,[21] in their review of the clinical features of pellagra, stress the frequency and severity of glossitis and include a colored plate of the most typical lesions. Others give similar descriptions.[22, 23] Early, there is swelling and redness of the tip and lateral margins of the tongue, and the papillae may be engorged; atrophy of the papillae may follow later, but is not prominent early. The reddening assumes a fiery-scarlet hue. Ulcerations may form, and often become covered with a greyish membrane in which Vincent's organisms may be found. Swelling, tenderness, pain and salivation may be prominent.[17] If the condition persists, the papillae may atrophy, and the tongue may become dry.[17] The dramatic response to niacin (nicotinic acid) therapy — with blanching of the redness within twenty-four hours and the healing of atrophic or ulcerative areas, and even disappearance of the associated Vincent's infection, in forty-eight to seventy-two hours — leaves no doubt about the specificity of this type of glossitis.

A somewhat similar type of glossitis, but not accompanied by the other usual clinical features of pellagra, has been frequently reported, often in epidemic proportions, in such varied places as Palestine,[24] China,[17] India[25, 26] during the siege of Madrid[27] and elsewhere.[28] The glossitis in these epidemics usually, but not always, responded to niacin therapy. These so-called "epidemics" occurred when large numbers of people were fed insufficient amounts of the same kind of food. This type of glossitis was in a sense considered "larval" pellagra.

Field, Parnall and Robinson[29] stress the fact that in the Northern part of this country pellagra is often atypical in appearance and different from the full-blown classic syndrome seen in the South. Lesser changes than a red, sore, atrophic tongue may be present. Sometimes, the tongue is merely swollen, somewhat painful and showing indentations from the teeth. At times, the lingual changes are those seen in the nondescript atrophic glossitis, which is described in a later section. The nonlingual aspects of this atypical pellagra syndrome are described in detail. This concept of pellagra is of special interest to the practitioners of New England.

*Riboflavin-Deficiency Glossitis*

The distinctive features that characterize the lingual changes attributable to riboflavin deficiency were first described by Jolliffe, Fein and Rosenblum[30] and Kruse, Sydenstricker, Sebrell and Cleckley.[31] In contrast to the fiery-red color of pellagra, the tongue in ariboflavinosis is magenta or purplish red. The epithelium over the papillae does not desquamate, but appears flattened and edematous, with resultant "mushroom-shaped" papillae that give the surface of the tongue a finely "pebbled" or granular appearance. Hence, the synonyms — pebbled tongue, granular tongue and magenta tongue — applied to this form of glossitis. Fissures may develop. The tongue may be painful, may have a burning sensation, and may even cause some dysphagia on swallowing. These lingual changes may precede and almost constantly accompany the cheilosis and seborrheic dermatitis of this deficiency state. Features of riboflavin deficiency helpful to diagnosis have been reviewed elsewhere.[32] Sydenstricker et al.[33] noted frequently that the red and atrophic tongue of pellagrins treated with niacin, with diets low in riboflavin, changed, over a period of weeks, to a magenta glossitis that, in turn, cleared up when riboflavin therapy was instituted. Weisberger,[34] on the other hand, believes that the glossitis of riboflavin deficiency is characterized by a primary lingual coating followed by a patchy oval desquamation, with the center atrophic and the edges whitish pink and raised. He believes that the specificity of these changes rests on their improvement with riboflavin therapy. However, this is not the generally accepted point of view.

The cause of the magenta color in the riboflavin-deficient tongue is not clear. Sydenstricker et al.[33]

studied the dorsum of these tongues in living patients with a microscope (magnification, 20x) and described the flattened papillae as "looking more like a dead jelly fish that has been washed up on the beach than anything else, a round translucent hemisphere with the capillaries lying deeply in a loose coil."

A logical explanation for this color change appears as follows: capillary dilatation and proliferation are prominent features in ariboflavinosis and undoubtedly take place in the mucosal portion of the papillae. If the capillaries are dilated, one may postulate that the circulation of red corpuscles through them may be slowed. The overlying epithelium is not desquamated but thinned and perhaps edematous. These dilated capillaries, with their stagnant blood flow seen through the changed epithelium, give the resultant magenta color to the tongue. The rapid blanching of the tongue following riboflavin therapy further supports this explanation. The normal tongue, in contrast, has a pinkish-white color because the underlying capillary loops of the mucosal portion of the papillae are covered by a partially opaque stratified squamous epithelium. The tongue in niacin deficiency and in the commoner atrophic glossitis, on the other hand, is scarlet or beefy red, because the overlying epithelial cells of the papillae desquamate, causing the capillary loops in the mucosal base of the papillae to be more prominent and their color more apparent. In addition, there seems to be a capillary response similar to inflammation in niacin deficiency.

*Glossitis From Other Deficiencies*

Lingual changes due to deficiencies other than niacin or riboflavin undoubtedly occur, but are, as yet, not well delineated. There appears to be no oral lesion characteristic of thiamine deficiency. Glossitis did not develop in human subjects placed on a thiamine-deficient diet.[35] There is the suspicion that vitamin A deficiency may produce hyperkeratotic changes in the oral mucosa.

Rosenblum and Jolliffe[23] noted cases of glossitis that failed to respond to niacin or riboflavin but improved with the use of vitamin $B_6$ (pyridoxine). They believe there may be lingual changes characteristic of pyridoxine deficiency. These tongues are described as smooth, slightly edematous, occasionally painful and of a peculiar purplish hue. Unfortunately, the full acceptance of this important observation is conditioned by the suggestion of others that pyridoxine may be necessary at times for the utilization of riboflavin.[33] Deficiency of other less well-known fractions of the vitamin B complex may cause lingual changes. This possibility is suggested by the response of glossitis to yeast or liver extract after failure to respond to the well-known pure vitamins such as riboflavin and niacin.[36] The cause of glossitis in pernicious anemia is not entirely certain.

Waldenström and Hallen's[37] studies indicate that iron deficiency may cause lingual changes that revert to normal with the use of iron alone. Glossitis is frequently present in the idiopathic hypochromic anemia of women,[3] an iron-deficiency disorder.

There is some evidence that the use of the estrogens either increases the demand for or suppresses the utilization of the vitamin B complex. Ashworth and Sutton[38] reported that the administration of estrogens to persons with a subclinical vitamin B complex deficiency produced glossitis as well as other lesions characteristic of a complete deficiency in the vitamin B complex.

*Hunter's Glossitis*

Hunter,[39] in 1909, studied the glossitis of pernicious anemia, attributing it to an infectious process. As late as 1927, Schneider and Carey[40] presented evidence to support this. Although the tongue in pernicious anemia may become infected secondarily, there seems but little doubt that the glossitis is on a deficiency basis. Lewis,[41] in 1930, summarized the evidence for this. It is a clinical characteristic of pernicious anemia that the glossitis accompanies relapses and clears with control of the anemia.

The subjective complaints of pain, burning and numbness are often a prominent feature, even at a time when gross changes are minimal, being especially prominent when spicy, salty or hot foods are placed in the mouth. Occasionally, small vesicles are noted about the edges that may break down and form tiny ulcers. The description of atrophic glossitis to follow later applies as well to Hunter's glossitis. A striking feature in severe relapses of pernicious anemia may be the contrast of the red atrophic tongue against the pallor of the buccal mucosa.

According to Castle,[42] the cause of glossitis in pernicious anemia is not entirely certain but, as suggested by the high incidence of achlorhydria in this disease, is conditioned by the absence of the so-called "gastric intrinsic factor." Thus, the glossitis of patients with pernicious anemia does not respond to experimental therapy with beef muscle unless normal human gastric juice is given simultaneously. In certain cases of sprue, however, the glossitis may improve with beef muscle alone, presumably because of the natural presence of gastric intrinsic factor.[43] Ventriculin and liver extract, which are effective remedies for the sore tongue in these conditions, so act because they contain a product of the interaction between a

food factor and gastric intrinsic factor derived from the normal animal. Castle[42] does not believe that the glossitis in pernicious anemia has any features that separate it from other forms of glossitis. Manson-Bahr[44] goes even farther: he believes that a glossitis of similar nature and nonspecific to the disease is found not only in pernicious anemia but also in sprue, pellagra, nutritional anemias and idiopathic steatorrhea.

Restoration of the tongue to normal, with regeneration of papillae, commonly follows the remission of pernicious anemia with liver extract therapy. This process has been followed objectively with the use of tongue prints.[20]

Myxedema (especially when anemia is prominent) and pernicious anemia are often confused with each other and may actually coexist. Means[45] points out that a red atrophic tongue is common in myxedema and increases the difficulty of this differential diagnosis. The person with myxedema is likelier to have a large clumsy tongue, pain being a less prominent feature, in contrast to the smaller but more painful tongue in pernicious anemia.

The term Hunter's glossitis may appropriately be applied to the lingual changes of pernicious anemia, but it implies no distinctive features of specific diagnostic value. The complaint of a sore tongue and the finding of glossitis suggest the diagnostic possibility of, but do not prove, the presence of pernicious anemia. All the diseases mentioned in the section on atrophic glossitis must be considered in the differential diagnosis.

*Moeller's Glossitis*

Moeller's glossitis, also known as glossitis marginalis exfoliativa or chronic superficial excoriations of the tongue, appears to be a poorly defined lingual condition that may be related to some deficiency state. Prinz and Greenbaum[5] consider it synonymous with Hunter's glossitis of pernicious anemia. Thoma,[6] on the other hand, believes it to be of varying etiology, and includes allergy, drug eruptions and neural disturbances as possible causative factors in addition to nutritional deficiency.

It consists of irregular, but well-defined atrophic areas, which are limited most frequently to the sides and tip of the tongue, are bright red, are never coated and are persistently painful. In fact, pain appears to be one of the most prominent features and is made worse by acid or hot foods, spices and so forth. It may be confused with "wandering rash" of the tongue. From the nutritional point of view, Moeller's glossitis appears to be a painful form of atrophic glossitis, the areas of atrophy being limited in extent and most frequently localized to the lateral edge and tip of the tongue. Its characteristics appear too indefinite for one to consider it a distinct entity.

*Atrophic Glossitis*

An atrophic glossitis not readily recognizable as due to any specific vitamin deficiency appears to be a common clinical finding. It is variously called atrophic glossitis, bald tongue, slick tongue, bald tongue of Sandwith, beet-red tongue and beefy-red tongue. Rhoads[19] expressed his inability to predict which therapy would be effective from the appearance of the tongue. Since in clinical practice deficiencies are multiple, it is to be expected that most cases of glossitis will be of complex origin and not one of the clear-cut specific lingual syndromes previously described.

This type of glossitis[2–4, 6, 20, 46–48] begins with desquamation of the epithelium of the filiform papillae at the tip and sides of the tongue. At times, small vesicles form and break down. The affected area appears red (atrophic), and may be painful if the desquamation is deep enough. Later, the filiform papillae over the dorsum desquamate. The tongue then appears red and smooth, with the fungiform papillae still prominent. Even the latter may eventually flatten and disappear. At this stage, the tongue has the appearance of a piece of raw red meat. The papillae are said to regenerate in the reverse order with appropriate therapy. These tongues may be dry, and at times some loss of taste is experienced. Because the circumvallate papillae seem to escape gross changes, the gustatory sense is not noticeably altered. If the tongue is slightly swollen, impressions from the hard palate and teeth may be noted on the dorsum or edges. Frequent comment can be found concerning the absence of a coat on the atrophic tongue.

Usually, the nature of the deficiency cannot be told from the appearance of the tongue. However, Kuo and Huang[17] believe that niacin deficiency is a main, but not necessarily the sole, feature when ulcers are present and inflammatory changes (scarlet hue) with minimal papillary atrophy are prominent findings in the glossitis. Atrophy of the papillae, with but little inflammation (a smooth pinkish-red tongue), is more suggestive of a liver-extract deficiency. Patients with atrophic glossitis should be treated with the whole vitamin B complex, that is, yeast or crude liver extract, in addition to such pure vitamins (riboflavin, niacin and so forth) or iron as seem indicated by the clinical evidence for their deficiency. Disappearance of the glossitis with regeneration of papillae has been noted in from five to thirty days in many patients thus treated.

Glossitis of this type has been noted in[3, 4] pernicious anemia, sprue, achlorhydric hypochromic anemia, pellagra, Plummer–Vinson syndrome, chronic dysentery, jejunostomy, intestinal stricture, dibotriocephalus-latus infestation, achlorhydria, steatorrhea[44] and myxedema.[45] Manson-Bahr[44] has reviewed this subject at great length. The high incidence of achlorhydria in almost all these conditions has been frequently commented on.[3, 4]

Oatway and Middleton,[20] in a detailed study, correlated the lingual changes with the gastric acidity, using tongue prints, made on smoked paper that was shellacked, to secure objective detail. Their work indicates that papillary atrophy was rare when normal acidity or hyperacidity was present, and frequent with achlorhydria. This study gives support to the clinical impression that achlorhydria and atrophic glossitis are frequently associated. Hutter, Middleton and Steenbock[48] produced smoothing of the highly serrated papillae of the tongues of rats kept on a diet deficient in vitamin B complex. Elsom[49] noted soreness and glossitis in a human subject placed on a diet deficient in the vitamin B complex. This did not clear with thiamine but responded to other factors in the B complex. This fact and the frequent response of glossitis to the various forms of therapy mentioned strongly support the contention that the presence of glossitis is a most valuable clinical sign and indicative that some form of nutritional deficiency is present.

Many workers believe that that appearance of the tongue may mirror the appearance of other portions of the gastrointestinal mucosa. The aphorism, "raw red tongue, raw red gut,"[41] has some objective proof to support it. Spies, Bean and Ashe[50] reported that pellagrins who were gastroscoped had a mucous membrane of the stomach similar in appearance to the stomatitis in the oral cavity. A patient studied at the Evans Memorial Hospital by Ingelfinger[51] is especially illuminating in this regard. This man, in his late thirties, had an ileostomy of long standing, performed because of intestinal obstruction of benign nature. He developed vitamin B complex deficiency, with a glossitis similar to the type mentioned above. The mucosa of the ileum, which could be readily inspected at the site of the ileostomy, was bright red and smooth and appeared edematous. Following appropriate vitamin therapy, both the glossitis and the injection of the ileum improved; the mucosa of the ileum became pink, and its pattern more prominent. Manson-Bahr[44] found by sigmoidoscopy that the rectal mucosa was hyperemic in acute sprue associated with glossitis and resembled in a general sense the changes seen on the tongue.

*Wandering Rash of Tongue*

Wandering rash of the tongue appears to be the accepted term for the not uncommon condition known also as geographic tongue, erythema migrans, exfoliativa areata linguae and numerous other synonyms.[5, 6, 52] It begins as a faint grey or whitish patch anywhere on the anterior dorsum of the tongue. The epithelium of the filiform papillae over this area desquamates, exposing the smoother red surface of the underlying mucosal layer, the isolated fungiform papillae appearing as shiny, red eminences. Thickened filiform papillae form a whitish border about these atrophic red areas, which are usually oval or circular in outline. These atrophic spots migrate continually but irregularly, the epithelium desquamating at one point and regenerating at another, to form bizarre circinate or geographic patterns. The spots may migrate within hours, days or weeks, may remain fixed for days or years, or may clear completely or return repeatedly at varying intervals for many years. Since only the superficial epithelial layer is involved, symptoms are usually absent, and the patient may not be aware of its presence. Greenbaum[53] has described a painful form, which appears to be rare.

Wandering rash of the tongue may be readily confused with the atrophic glossitis of deficiency disease. Yet it appears etiologically unrelated to any of the vitamin deficiencies. The patchy desquamation described by Weisberger[13] for riboflavin deficiency is histologically different. Rhoads[54] has not seen a cure of this condition from the use of vitamin B complex therapy. When the atrophic patches are along the lateral aspects of the tongue, it may be readily confused with Moeller's atrophic glossitis, but the frequent presence of pain in the latter condition serves to make their differentiation possible.

Wandering rash is common in children, but may be seen at all ages and may appear periodically or continuously throughout life, with perhaps a tendency to disappear as middle age is reached. Prinz and Greenbaum[5] consider it a local expression of a constitutional neuropathic anomaly. Thoma[6] believes that there is some evidence for a hereditary background. No therapy is required in most cases.

*Grooved Tongue*

Grooved tongue, also known as fissured, furrowed or scrotal tongue, a congenital anomaly present in about 0.5 per cent of the tongues of the human race irrespective of age, is commoner in men and often inherited through the male sex.[5] The monograph by Prinz and Greenbaum[5] contains a detailed description of this condition and

a representative photograph. In addition to a more or less pronounced median raphe, the dorsal surface of the tongue contains deep furrows running more or less symmetrically parallel to each other in a lateral direction and more rarely parallel to the raphe. The furrows vary in depth and length and may fork, and their edges can be separated; they resemble the ribs of a leaf in pattern and the corrugated appearance of a contracted scrotum — hence the name. It is of interest that Oatway and Middleton[20] found hyperchlorhydria to be not uncommon in persons with a scrotal tongue.

Commonly, no symptoms are present, taste and touch are normal, and no treatment is indicated; rarely, the fissures may become infected and painful. Frequently, slight macroglossia is present, when the imprints of the teeth along the border are noticeable. An associated wandering rash is said to be common. Occasionally, the number and size of the fungiform papillae are increased, with the result that the color of the tongue is redder than usual.

The appearance of this lingual anomaly, especially when associated with a wandering rash, may lead to its confusion with the atrophic, red, edematous tongue of a deficiency state. Its frequency must be kept in mind; a person with this congenital defect may also develop a glossitis of deficiency origin, and both conditions may then coexist.

*Black Hairy Tongue*

Black tongue or black hairy tongue in human beings[6, 55, 56] is a rare, but fairly chronic and usually symptomless condition, and results from hypertrophy and elongation of the filiform papillae of all or a portion of the medial dorsum of the tongue. The color depends on staining of the papillae and may be brownish, bluish or black; the last when the fungus, *Penicillium mucor niger*, is present on the filiform papillae. It is of interest in that black tongue in human beings may be confused (mostly in name) with black tongue of dogs, the latter being the canine counterpart of human pellagra. Although an isolated report[57] stresses treatment of this condition with nicotinic acid, there is no proof that a nutritional deficiency is responsible for it. In view of what has been presented in this paper, one wonders what would happen to a patient with this disorder if he were placed on a diet free of vitamin B.

* * *

Most physicians have trouble recording on paper a term descriptive of what they have seen after looking at a patient's tongue. The manifestations resulting from certain systemic diseases and specific tongue diseases can be readily identified and described as such. Aside from these, the appearance of the vast majority of tongues can be described as falling into one of the following categories*: normal tongue; coated tongue; grooved (scrotal) tongue — with a coat, with macroglossia, with wandering rash or with atrophy; pellagrous glossitis; riboflavin deficiency glossitis (magenta tongue); atrophic glossitis (including Hunter's and Moeller's glossitis) — with complete smoothing, slight general smoothing or marginal smoothing; wandering rash of tongue; and black (brown) hairy tongue. With *salivation* or *dryness*, with *ulcerations* or *fissures* and with *microglossia* or *macroglossia* can be added as supplemental descriptive terms, if necessary.

Pellagrous glossitis or ariboflavinotic tongue should not be diagnosed unless there is other supporting evidence for these specific deficiencies, or unless the tongue is unusually characteristic.

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*This classification is a modification of the simpler one proposed by Oatway and Middleton.[20] The use of such a classification will be found very helpful in clarifying and simplifying the recording of the lingual appearance in hospital and office records.

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# CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

## CASE 28321

### PRESENTATION OF CASE

A fifty-seven-year-old widow was referred to the hospital by her physician because of an upper abdominal mass.

Seven weeks prior to admission, when the patient was examined by her physician because of an upper respiratory infection, a mass was felt in the upper abdomen. When specifically questioned, she recalled vague abdominal discomfort unrelated to her dietary habits. Her appetite had always been good. No bowel habit changes were recalled except for diarrhea on a single day two weeks prior to admission. The stools had been normal in appearance.

The past history was not remarkable except for an operation on the thyroid gland performed one year previously. The menopause occurred seven years before admission. There had been no bleeding since then. During the five months prior to admission, the patient noted ankle swelling in the evening; there was no associated dyspnea or orthopnea.

Physical examination revealed a well-developed, slightly obese woman who was in no discomfort. The pharynx and tonsils were congested. There was slight spasm in the right upper abdomen, and a mass could be felt in this region. The heart and lungs were normal, and the rest of the physical examination was negative.

The temperature was 98.6°F., and the pulse 100. The blood pressure was 120 systolic, 74 diastolic.

The blood was normal. The urine was normal except for 10 to 15 white blood cells per high-power field and a slight growth of *Staphylococcus albus*. The stool was brown and guaiac negative.

A barium enema revealed several diverticulums of the descending colon. A gastrointestinal series and intravenous pyelogram were negative. A Graham test showed no concentration of the dye in the gall bladder. No stones were demonstrated. The abdominal flat film showed a round soft-tissue shadow about 11 cm. in diameter in the right midabdominal field overlying the crest of the ilium and lower pole of the right kidney. Review of these films showed that the soft-tissue mass was inferior to the liver and produced little pressure on the colon.

On the twelfth day, an operation was performed.

### DIFFERENTIAL DIAGNOSIS

DR. ROBERT R. LINTON: In summary, this fifty-seven-year-old woman apparently had a mass in the right upper quadrant, with very few if any related symptoms. What are the possibilities with a mass in the right upper abdomen? One thinks first of gall-bladder conditions. A second possibility is a tumor of the right portion or hepatic flexure of the colon. A third is a tumor involving the right kidney. Other remote possibilities are gumma of the liver, tumor of the pancreas and echinococcal cyst. Certainly, we have no evidence that the last was present, and we have no laboratory findings to help us out on that diagnosis. Tumor of the head of the pancreas of that size would certainly have produced some signs of biliary obstruction, which were not present. A tumor involving the lower pole of the kidney is apparently ruled out because of the negative pyelogram. The question of hepatic-flexure growth can also be fairly well ruled out, I believe, by the barium enema, which was negative except for the diverticulosis, which I do not believe played any part in this patient's story. The hepatic flexure is known to be hard to visualize by x-ray, but I think we can rely on the report that the barium enema was negative for a lesion in this portion of the colon. In addition, there was a negative guaiac test on the stool.

The question of gall-bladder disease should be seriously considered. I do not believe it is necessary for patients with gall-bladder disease to have many gastrointestinal symptoms. Certainly, this patient had a minimum, if one accepts the story as it is written here.

One other condition that might be considered is a fibroid of the uterus. It is unusual to see fibroids above the pelvis, especially in the right abdomen, but I know that they do occur there. An ovarian cyst should also be thought of. I think these are unlikely, however, in view of the fact that the patient was seven years past the menopause. Before going on any farther with the discussion, I think we might see the x-ray films.

DR. LAURENCE L. ROBBINS: The mass is rather hard to see on these films, but this is its location. It apparently causes a little pressure on the proximal portion of the transverse colon. The mass appears to be homogeneous, and is of soft-tissue density.

DR. LINTON: Should you say that it was above the transverse colon?

DR. ROBBINS: I should say that it was. I think this represents the mass here.

A PHYSICIAN: Is there a kidney film?

DR. ROBBINS: There is a film in which one can see the right kidney, which seems to be all right. The film was taken to show the gall bladder; it shows the right-kidney shadow very clearly, however.

DR. LINTON: The intravenous pyelogram does not show any abnormality?

DR. ROBBINS: It does not show any pressure on the calyxes that I can see.

DR. LINTON: It also shows the kidneys very well. The mass as I see it is a rather spherical one. Is that right?

DR. ROBBINS: Yes.

DR. LINTON: It is rather unusual for a gall-bladder shadow. However, it is located in the proper position — under the inferior surface of the liver and pressing the hepatic flexure and transverse colon downward.

One other condition that I had not considered is mesenteric cyst. I do not know any way to rule it in or out, but I think it is a possibility. The mass seems too far lateral on the right side to suggest a pancreatic cyst. I think the differential diagnosis lies between a dilated gall bladder, a hydrops of the gall bladder with a stone impacted in the ampulla and a tumor of the lower pole of the kidney, without evidence of pressure on the kidney; in view of the x-ray film, I must make a diagnosis of hydrops of the gall bladder. The negative Graham test adds support to this diagnosis.

### CLINICAL DIAGNOSIS

Hydrops of gall bladder.

### DR. LINTON'S DIAGNOSIS

Hydrops of gall bladder, with stone impacted in ampulla.

### ANATOMICAL DIAGNOSES

Hydrops of gall bladder.
Acute and chronic cholecystitis.
Cholelithiasis.

### PATHOLOGICAL DISCUSSION

DR. TRACY B. MALLORY: This patient was explored, and a very large, greatly dilated gall bladder was found. When it was opened, it contained nearly colorless bile. It showed a number of small white stones. The walls showed both chronic and acute inflammation, and there was one abscess in the wall. It is a little surprising that the patient did not have some evidence of systemic reaction because there was quite marked infection, as well as mechanical stasis.

DR. LINTON: What was the obstruction due to?

DR. MALLORY: I should have mentioned that a stone was impacted at the mouth of the cystic duct.

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## CASE 28322

A sixty-year-old man entered the hospital complaining of dysphagia of two weeks' duration.

The patient was well until six months before admission, when he began to feel weak and run down and noticed that he was losing weight. Approximately two months before admission, because of continued weight loss, he consulted his physician, who had a chest plate taken and told the patient that he had tuberculosis. Three weeks later, he entered another hospital; at the time, he had a slight cough productive of white sputum. No tubercle bacilli were found in the sputum on repeated examinations, and a chest plate was said to have been somewhat characteristic of tumor. Two weeks before admission, the patient had a severe paroxysm of coughing and raised about 30 cc. of bright-red blood. This was followed immediately by persistent dysphagia, which increased so that at the end of a week he was able to swallow only small amounts of ice water and subsisted on parenteral fluids. There had been no vomiting, regurgitation or other symptoms referable to the gastrointestinal tract or respiratory system. The patient was transferred to this hospital, and on admission his cough was still productive of about a cupful of white sputum each day. He had lost 60 pounds, and complained of profound weakness.

The patient's father had died at seventy-three of a tumor in the abdomen.

On examination, the patient was extremely emaciated, dehydrated and weak. Examination of the chest showed poor aeration throughout the right lung, with absent signs at the base, more prominent posteriorly, and diminished to absent breath sounds over the upper lobe. There was no apparent shift of the mediastinum, and the left lung was clear. The heart was normal. Abdominal and rectal examinations were negative.

The temperature was 99.2°F., and the pulse and respirations were normal. The blood pressure was 120 systolic, 80 diastolic.

The urine was normal. Examination of the blood showed a red-cell count of 3,500,000 with a hemoglobin of 12.7 gm. (photoelectric-cell technic), and a white-cell count of 52,000 with 93 per cent polymorphonuclears. The nonprotein nitrogen of the blood serum was 16 mg. and the protein 5.1 gm. per 100 cc.; the chloride was 104.2

milliequiv. per liter, and the carbon dioxide combining power 29.9 vol. per cent. A blood Hinton reaction was negative.

X-ray films of the chest showed a large mass in the posterior upper mediastinum that displaced the esophagus and trachea forward. A large portion of this mass was seen to lie in the tracheobronchial angle. There was extensive mottled consolidation in the lower portion of the right lung field, which, in the lateral view, was seen to correspond mainly to the lower lobe, with possible involvement of the middle lobe. The chest was large, particularly in the precordial space, and the diaphragm was low.

On admission, attempts to pass stomach tubes of various sizes met with obstruction in the mid-esophagus. A barium swallow the following day showed extrinsic pressure on the esophagus, and a moderate amount of barium passed into the stomach. Following this procedure, the patient was able to take esophageal feedings. The esophagus was dilated with bougies, and he could swallow water and food, nourishment being supplemented by intravenous fluids. Two weeks after admission, the sputum became copious and purulent. X-ray therapy was started, but the first treatment had to be discontinued because of the patient's condition. He rapidly failed, and died on the seventeenth hospital day.

## Differential Diagnosis

Dr. Helen S. Pittman: The sequence of events in this case is weakness and weight loss, cough and, finally, bleeding after a very severe paroxysm of cough. Immediately after this, the patient had dysphagia, which increased in a week to a point where he could swallow only small amounts of ice water. There had been no symptoms pointing to the gastrointestinal tract until immediately after the severe cough and hemorrhage.

Two months before admission, when the only complaints were weakness and weight loss, a chest plate showed something interpreted as tuberculosis. I believe this was the "extensive mottled consolidation in the lower portion of the right lung field" that was present on our films. The film three weeks later, by which time the patient had a slight cough, was said to have been more characteristic of tumor. I interpret this as referring to the large mass visible in the mediastinum, which either did not show up on the first film (and I think it might easily have been missed on a posteroanterior film) or had increased in size in three weeks.

The severe paroxysm of cough might have been caused by pressure or by aspiration, but it would not have produced 30 cc. of blood unless the act of coughing ruptured something. The dysphagia that followed suggests that there was internal as well as external bleeding, producing a hematoma that pressed on the esophagus.

On admission, the patient was emaciated and dehydrated. The red-cell count and the protein of 5.1 gm. per 100 cc. are consistent with his malnutrition. The other chemical levels are within the normal range. The white-cell count of 52,000 makes one think at once of leukemia. We are not given a description of the smear, but are told only that there were 93 per cent polymorphonuclears. In the absence of any information about abnormal cells, this may be interpreted as indicating suppuration. Two weeks after admission, the sputum became copious and purulent. This I interpret as drainage of multiple small pulmonary abscesses that, undrained, had been responsible for the leukocytosis. I suppose one should consider the possibility of trauma from the passage of bougies, with subsequent infection, but I shall not do so in view of the elevated white-cell count on admission.

There were apparently two lesions within the chest, — the mass in the mediastinum and the right-lower-lobe disease, — and it is of the utmost importance in arriving at a diagnosis to try to decide which came first. If we accept the sequence as demonstrated by the x-ray films and assume that the intrapulmonary disease came first, we may say that the mass represented mediastinal metastasis or abscess. I have never seen a metastasis like this, and I do not believe the patient was sick enough for this to have been a mediastinal abscess.

It seems reasonable to assume that the mass was the older, even though it was not seen on the first x-ray film. The commonest tumor of the posterior mediastinum is neurofibroma. These tumors frequently arise from the wall of the esophagus but do not invade it, therefore giving external pressure only. The simple cysts of the mediastinum that I have seen have been lower. They usually arise from bronchial epithelium and therefore lie anterior to the esophagus. However, hemorrhage in a cyst with external leak would account for the sequence of bleeding and sudden dysphagia, and must be considered. Leakage from an aneurysm might behave in the same way, but the site of this mass would correspond to the ascending aorta, which was anterior and not posterior; the blood Hinton reaction was negative; finally, although we are given no fluoroscopic note of whether or not the mass pulsated, we know that x-ray treatment was planned, and I think aneurysm, unless nonpulsating because of laminated clot so that the fluoroscopist was misled, may be excluded. Lymphoma must be included in every such differential diagnosis. I see no way to rule it in except by x-ray response. The patient

could not tolerate even one treatment, but I attribute that to his general condition, for there was not time for it to have been reaction to x-ray therapy. An intrathoracic thyroid gland lies anterior, and a dermoid cyst and sarcomas are usually anterior. Carcinoma of this size arising from a bronchus should cause bronchial obstruction and atelectasis, and there were none.

Whatever the nature of the mediastinal mass, we must not forget the process in the right lower lobe. There was poor aeration throughout the right lung, with "absent signs" at the base, whatever that means. That does not help much, for, if the lesions were central, there need have been no characteristic physical signs. Aspiration pneumonia is usually bilateral but may occur on one side, and the right lower lobe is said to be the commonest site. However, it seems unlikely that the patient could have aspirated sufficient food to give this reaction without any conscious dysphagia. We have no information to suggest phlebitis, from which he might have had pulmonary emboli. Spontaneous abscess is usually single rather than multiple.

The patient was weak and run down, and lost weight for almost five months before he had any cough. This is not too uncommon in carcinoma of the bronchus. Infection distal to bronchial carcinoma is almost the rule, although when there is sufficient obstruction to allow infection behind it, there should be a wheeze if one listens for it. Patients with bronchial carcinoma bleed as this man did. Benign adenoma can behave exactly like carcinoma, and the diagnosis can be made only by biopsy. It is my impression, however, that in most cases of adenoma there is complete obstruction, with atelectasis.

As in most tumors, the diagnosis without tissue examination is one of guesswork. I therefore make my guess that the most probable diagnoses were two independent conditions: neurofibroma, probably arising from the esophagus; and primary carcinoma of the right-lower-lobe main bronchus, with abscess formation behind the bronchial obstruction.

### Clinical Diagnoses

Carcinoma of lung, bronchiogenic.
Bronchopneumonia, slight.

### Dr. Pittman's Diagnoses

Neurofibroma, probably arising from esophagus.
Primary carcinoma, right-lower-lobe main bronchus, with abscess formation behind bronchial obstruction.

### Anatomical Diagnoses

Epidermoid carcinoma, bronchiogenic, of right upper lobe, with extension to esophagus, vertebras and mediastinal lymph nodes.
Pulmonary abscesses, multiple, right upper lobe.
Empyema, right, massive.
Emaciation.

### Pathological Discussion

Dr. Tracy B. Mallory: The contiguity of the upper respiratory and gastrointestinal tracts makes it comparatively easy for a malignant process arising in either to invade the other at a comparatively early stage of its development. Consequently, we see cancers of the lungs with the presenting symptom of dysphagia, and primary cancers of the esophagus in which the first symptom may be cough or hemoptysis. The picture is often further complicated by extensive secondary infection so that one is often faced with a double-barreled problem, as Dr. Pittman was in this case, and must try first to name the source of the neoplasm and secondly to localize the complicating infection. I do not believe in this case Dr. Pittman received the help from the roentgenologist that she might reasonably have expected. I am quite unable to make the facts determined at autopsy check with their recorded observations.

The primary lesion, as Dr. Pittman predicted, was neoplasm, a carcinoma arising in the bronchus to the right upper lobe. It had grown downward along the right primary bronchus, which was almost completely occluded. The tumor occupied approximately half the upper lobe, and the lungs peripheral to it contained innumerable abscesses, one of them measuring 2 cm. in diameter. In contrast, the right lower lobe where the radiologist found evidence of extensive consolidation showed practically nothing but minimal acute terminal bronchopneumonia at the time of autopsy. There was also on this right side an extensive empyema consisting of nearly 2000 cc. of very turbid foul-smelling fluid. This unquestionably was a terminal event, and there was no evidence pointing to it in the recorded summary. The tumor had invaded extensively the posterior mediastinum and, in fact, had extended deeply into the two upper thoracic vertebras. It had grown through the wall of the esophagus, and two intraluminal tumor masses were present to account for the esophageal obstruction. The mucosa over these was not ulcerated, however. Consequently, the picture was not unlike that seen with an intramural leiomyoma or neurofibroma of the esophagus, as Dr. Pittman suggested. No distant metastases were found.

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The Journal does not hold itself responsible for statements made by any contributor.

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## WAR AND VENEREAL DISEASE

This country is at war, and venereal disease is on the increase. Just when the national campaign against syphilis and gonorrhea was beginning to bear fruit, there has been an upward turn in the incidence curve of these diseases, chiefly owing to an increase of the venereal-disease rate in the armed services. Every possible effort is being made to educate the men to avoid these diseases, and healthy activities to employ their spare time are provided. The Army and Navy Medical Corps and the United States Public Health Service are expanding their personnel as rapidly as possible to cope with the situation. Two outstanding problems in this field require the co-operation of practicing physicians.

The first concerns the situation in cities and towns near large encampments of men. The efficient handling of prostitution and of syphilis and gonorrhea in the civil population requires the closest co-operation of the military and civil authorities and the physicians of the particular district. Provisions for the detection of new and old cases, for their quarantine and for adequate treatment and follow-up are taxing the resources of many communities. Somehow or other, the job must be done, to avoid the noneffectiveness that existed in the last war.

The second problem concerns the selectees who are excluded from military service because of evidence of syphilis or gonorrhea. Some of these 45,000 men from the first million selectees could undoubtedly be rendered fit for service, but they must be followed up and treated. Elsewhere in this issue of the *Journal*, Dr. Vonderlehr indicates that only half these men have been brought to treatment and that many communities have done comparatively little in the way of finding them. He points out, "If this opportunity is lost, . . . it will constitute one of the greatest public-health and medical failures in the history of the United States."

## THE HERITAGE OF CONNECTICUT MEDICINE

The Connecticut State Medical Society celebrated its sesquicentennial this year in June at Wesleyan University, with an appropriate program of general and historical interest and by the publication of *The Heritage of Connecticut Medicine*,* a volume containing a history of early medicine in the state and numerous essays on famous Connecticut physicians — William Beaumont, Horace Wells and the Doctors Welch — and the advances in medical teaching and practice, public health, psychiatry, physiology, surgery and tuberculosis as they have developed in Connecticut. Both the meeting and the book are outstanding contributions; Connecticut, with its first meeting of the state medical society in 1792, has indeed set an example that other states might well follow.

**The Heritage of Connecticut Medicine.* By various authors. Edited by Herbert Thoms, M.D. 223 pp. New Haven, Connecticut: privately printed for the Connecticut State Medical Society, 1942.

The beginnings of organized medicine in Connecticut go back well into the eighteenth century, since an attempt was made to obtain a charter as early as 1763. This failed but, in 1784, the New Haven County Medical Society was founded, and its famous transactions, *Cases and Observations*, printed in 1788, was the first medical publication in this country. It was not until October 9, 1792, however, that thirty-six practitioners of medicine gathered in the Court House in Middletown for the first meeting of the Connecticut State Medical Society. The names of these physicians have a familiar ring in New England medicine,—Hubbard, Munson, Potter, Tudor, Flagg, Mather, Coit, Clark, Lord, Woodward and others,—and not a few men bearing the same surnames serve Connecticut and the other New England states today.

Thus, the fourth state medical society to be established in America came into being; its past performance is great, and its future can be no less. Many should read, with pleasure and profit, the history of the illustrious past of this state medical society, and of the lives of the physicians who made it. The volume is worthy of the heritage presented on its pages, and shows that Connecticut doctors of our day have thoughtfully and wisely evaluated the work of their colleagues of the past.

## MEDICAL EPONYM

### Purkinje Fibers

These fibers were described by Professor Johann Evangelista von Purkinje (1787–1869), of Prague, in an article "Mikroskopisch-neurologische Beobachtungen [Microscopic-neurologic Observations]," published in the *Archiv für Anatomie, Physiologie und Wissenschaftliche Medicin* (**681**: 281–295, 1845). A portion of the translation follows:

> On the inner walls of the ventricles of the sheep's heart, I observed, first with the naked eye, a network of gray, flat, gelatinous threads immediately beneath the serous membrane. . . . On microscopic examination, I found these threads to be entirely made up of granules. . . . Inside each granule, there were one or two nuclei without any spherical envelope such as is seen in true ganglion cells. The fibers were formed of cross rows of five or ten of these granules, arranged serially in bundles.

R. W. B.

## MASSACHUSETTS MEDICAL SOCIETY

### COMMITTEE ON MATERNAL WELFARE

#### Case History: Fatal eclampsia

A thirty-eight-year-old multipara had had adequate though unintelligent care during her ninth pregnancy. Her previous pregnancies had been normal, and the past history was irrelevant. At the beginning of this pregnancy, the blood pressure was 150 systolic, 90 diastolic; the systolic blood pressure rose to 170 during the last two months. The patient had been seen every two weeks from the third month of pregnancy, and the urine was reported to be normal. In the last month of pregnancy, she was seized with a sharp pain under the right shoulder, for which she was given ¼ gr. of morphine. Two or three hours later, she began to flow and had a convulsion, which was the first of several that occurred before she entered the hospital. The day after entry, she delivered herself of a stillborn baby. There was no post-partum hemorrhage, but she had one convulsion after the birth of the child. Examination of the blood showed a steadily rising nonprotein nitrogen; almost complete anuria developed, which resulted in death ten days after delivery.

*Comment.* This death was undoubtedly an unnecessary obstetric fatality. Any patient who starts a pregnancy with a systolic blood pressure of 150 that reaches 170 at seven months and continues at that elevation should probably never be allowed to go to term. After the convulsion, nothing could have been done that was not done to ensure recovery. Induction any time after the beginning of the last month, either by rupture of the membranes or by the use of a Voorhees bag,—preferably the former,—would have saved the mother's life and probably prevented the death of the baby.

Routine visits on patients of this sort do not necessarily mean intelligent obstetrics. This patient had routine care; it was not, however, intelligent.

### DEATHS

BRYANT—Alice G. Bryant, M.D., of Boston, died July 25. She was in her eighty-first year.

Born in Boston, Dr. Bryant received her degree from Woman's Medical College of the New York Infirmary for Women and Children in 1890. She was associated with Vincent Memorial Hospital, New England Hospital for Women and Children and New England Deaconess Hospital. She was a member of the American Academy of Ophthalmology and Oto-Laryngology, and a fellow of the Massachusetts Medical Society and the American Medical Association.

BURNETT — N. Lowe Burnett, M.D., of Cambridge, died July 20. He was in his fifty-sixth year.

A native of Springfield, Dr. Burnett received his degree from Queen's University Faculty of Medicine in 1915. He was president of the Bay State Medical Association, and a former member of the Massachusetts Medical Society and the American Medical Association.

His widow, three sons and a daughter survive him.

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FROTHINGHAM — Charles B. Frothingham, M.D., of Lynn, died May 28. He was in his eighty-fifth year.

Dr. Frothingham received his degree from Dartmouth Medical School in 1892. For many years, he was city physician in Lynn and a member of the school committee. He was a former member of the Massachusetts Medical Society.

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GLIDDEN — Howard K. Glidden, M.D., of Swampscott, died May 30. He was in his sixty-eighth year.

Dr. Glidden was a former member of the Swampscott Board of Health, and a former member of the Massachusetts Medical Society and the American Medical Association.

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MORSE — Almon G. Morse, M.D., of Hingham, died July 27. He was in his seventy-fifth year.

A native of Watertown, Dr. Morse received his degree from Harvard Medical School in 1894. He served as house officer, assistant surgeon and surgeon-in-chief at the Massachusetts Eye and Ear Infirmary. He was a member of the Massachusetts Medical Society and the American Medical Association.

His widow, two sons and a daughter survive him.

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STACK — Charles F. Stack, M.D., of Hyde Park, died April 3. He was in his seventy-second year.

Born in Hyde Park, Dr. Stack received his degree from Harvard Medical School in 1898. He served his internship at Boston City Hospital and did postgraduate study in Europe. He was a member of the Massachusetts Medical Society and the American Medical Association.

A son and a daughter survive him.

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## WAR ACTIVITIES

### CIVILIAN DEFENSE

The following memorandum was recently issued by the Office of Civilian Defense, Washington, D. C., regarding the relation of emergency medical services to industrial plants.

* * *

The primary responsibility for the protection of industrial plants rests on the operators, owners, and local and state governments. The War and Navy departments have included in their protective program the responsibility for surveying and recommending protection within certain civilian manufacturing plants engaged in the production of war materials, as well as for plants owned and operated by these departments. The emergency medical services provided in these plants and in all other plants should be closely integrated with the local emergency medical services. The War and Navy departments have requested all civilian manufacturing plants having important war contracts to co-operate with the local emergency medical service of the United States Office of Civilian Defense. All local chiefs of emergency medical services should be prepared to co-operate with the managements of plants having important War and Navy contracts whenever requested, by responsible officials within the plants, to do so.

All industrial plants are expected to provide medical services and first-aid equipment within the plant for the care of the injured. In the event of enemy action directed against such industrial plants, the physicians, nurses and first-aid detachments within the plants may be inadequate to care for the serious injuries produced by high explosives or incendiaries. It is the recommendation of the Office of Civilian Defense that each industrial plant, in addition to providing its own medical staff and first-aid equipment, should plan in collaboration with the chief of emergency medical services of the locality for services of ambulances, when needed; available beds at one or more hospitals, to which the severe casualties may be transported; the establishment of a casualty station of the emergency medical service within a short distance of the plant; and the services of emergency medical field units, if needed to supplement the plant medical service during an emergency.

In view of the fact that enemy action against industrial plants may be coincidental with widespread damage to the adjacent community, the mobilization of civilian medical resources during an emergency will be accomplished through the commander of the citizens' defense corps.

If a plant is miles from a hospital and there is, therefore, a possibility that the injured may be obliged to remain at the casualty station for many hours before being transferred to the hospital, the casualty station should be larger than the average for a given number of employees and be adequately equipped. It must have cots, blankets, water and heating facilities, and be equipped at least with the emergency medical supplies.

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## MISCELLANY

### NOTES

Thirty-three appointments to the teaching and research staffs of the Harvard Medical School, effective July 1, were recently announced by Harvard University as follows:

*Assistants in surgery*: Robert K. Brown, of Colorado Springs, Colorado, M.D. Harvard '37; Richard C. Durant, of Great Barrington, Massachusetts, M.D. Harvard '34; Howard A. Frank, of Woodmere, Long Island, New York, M.D. New York University '37; John J. Lowrey, of Honolulu, M.D. Harvard '40; Donald D. Matson, of Altadena, California, M.D. Harvard '39; Arnold Porter, of Providence, Rhode Island, M.D. Harvard '40; Frank R. Pierce, of Gardner, Massachusetts, M.D. Harvard '34; Carter R. Rowe, of Fredericksburg, Virginia, M.D. Harvard '33; Eric R. Sanderson, of Boston, M.D. Harvard '37; Neil W. Swinton, of Waban, Massachusetts, M.D. University of Michigan '29; and Lester P. K. Yee, of Honolulu, M.D. Harvard '37.

*Assistants in medicine*: Howard E. Allen, of Salt Lake City, M.D. Pennsylvania '38; and Samuel Stearns, of Dorchester, Massachusetts, M.D. University of Michigan '39.

*Research fellows in medicine*: Grosvenor W. Bissell, of Buffalo, New York, M.D. University of Buffalo '39; William C. Bridges, of Tacoma, Washington, M.D. Yale '40; Harry A. Feldman, of Newark, New Jersey, M.D. George Washington University '39; Seymour S. Kety, of Philadelphia, M.D. Pennsylvania '40; Charles R. Park, of Garrison, Maryland, M.D. Johns Hopkins '41; and Edward

C. Reifenstein, Jr., of Syracuse, New York, M.D. Syracuse '34.

*Assistants in gynecology*: John R. Barker, of Waban, Massachusetts, M.D. Tufts '31; and Charles L. Sullivan, of Brookline, Massachusetts, M.D. Boston University '35.

*Teaching fellows in bacteriology and immunology*: Charles A. Macgregor, of Rumford, Maine, M.D. Harvard '42; and James H. Strauch, of Canton, Ohio, M.D. Harvard '42.

*Instructors in nutrition*: David M. Hegsted, of Chicago, Ph.D. Wisconsin '40; and John M. McKibbin, of Madison, Wisconsin, Ph.D. Wisconsin '42.

*Visiting lecturer on anatomy*: William C. Young of New Haven, Connecticut, Ph.D. University of Chicago '27.

*Instructor in anatomy*: Richard J. Blandau, of Providence, Rhode Island, Ph.D. Brown '39.

*Teaching fellow in anatomy*: Macelyn V. Anders, of Marietta, Ohio, S.M. Brown '42.

*Assistant in bacteriology and immunology*: John B. Hamblet, of Lowell, Massachusetts, M.D. McGill '40.

*Assistant in roentgenology*: Lloyd E. Hawes, of West Somerville, Massachusetts, M.D. Harvard '37.

*Assistant in psychiatry*: James E. Roy, of Worcester, Massachusetts, M.D. Harvard '39.

*Assistant in neurology*: Frederick G. Woodson, of University, Virginia, M.D. University of Virginia '38.

*Instructor in pathology*: Clinton Van Z. Hawn, of Albany, New York, M.D. Harvard '41.

Dr. Harris P. Mosher, professor of laryngology and otology, emeritus, at Harvard Medical School, was awarded an honorary degree at the recent commencement exercises of Jefferson College, Philadelphia.

Dr. Reginald Fitz, lecturer on the history of medicine and assistant to the dean, Harvard Medical School, recently delivered the commencement address at the University of Vermont College of Medicine.

Dr. Frederic A. Gibbs, of Boston, was recently elected secretary-treasurer of the American Branch of the International League against Epilepsy.

Fifteen members of the first-year class at Tufts College Medical School were recently awarded Charles Hayden Memorial Scholarships of $250 each. Dr. Cadis Phipps, chairman of the scholarship committee and head of the Department of Medicine, distributed certificates denoting the awards. The recipients were as follows: John J. Carty, of Jamaica Plain; Francis L. Colpoys, Jr., of Brighton; Harvey H. Corman, of Dorchester; Francis X. Mack, of Milton; Edward Martin, Jr., of Milton; John A. McGowan, of Medford; John C. McLaughlin, of Brookline; Willard Nicholl, of Needham; Emil Pagliarulo, of East Boston; Vincent P. Perlo, of Brookline; Harold S. Rubin, of Swampscott; Robert J. Scannell, of Brighton; Stuart A. Silliker, of Cambridge; Richard E. Stiles, of Roslindale; and Francis A. D'Ambrosia, of Boston.

## CORRESPONDENCE

### LEGAL ASPECTS OF FIRST AID

*To the Editor*: I have been greatly interested in the work that is being done in training groups of laymen in first aid. But neither in the courses for air-raid wardens nor special police, which I have attended, in the course for physicians given by the Massachusetts Committee on Public Safety nor in any publication have I seen any reference to the medicolegal aspect of first aid.

These men and women, who are giving their time and energy to prepare for the emergencies that seem more inevitable day by day, deserve nothing but commendation. They are doing a fine piece of work, of which the public, including the medical profession, knows too little. If, as a result of their efforts to care for air-raid victims, they are to incur the risk of becoming defendants in lawsuits, brought by disgruntled "victims" whom they have attended, the fact should be known, so that they may be informed concerning both the extent of the risk and the means at their disposal for avoiding such liability or of meeting it when it comes. Physicians know that it is idle to rely on the gratitude or sportsmanship of patients for protection from lawsuits, and it is not likely that these laymen would find themselves in any better position in the event of some unforeseen catastrophe.

CHARLES E. WELLS, M.D.
15 Union Street
Randolph, Massachusetts

* * *

Dr. Wells was referred to an article, "Legal Aspects of First Aid by Lay People," in the June, 1942, issue of *Minnesota Medicine*. Since the laws governing such actions vary from state to state, the *Journal* will attempt to obtain an opinion concerning the legal aspects of first-aid care in Massachusetts. — ED.

## REPORTS OF MEETINGS

### NEW ENGLAND PEDIATRIC SOCIETY

A regular meeting of the New England Pediatric Society, with Dr. Warren R. Sisson presiding, was held at Longwood Towers on March 25.

The first speaker was Dr. Richard M. Smith, whose talk was entitled "Protection of Children in Wartime." Definite problems are precipitated in the danger zones of the seaboard and areas near defense industries or military targets. It has been generally agreed that the registering of all children in such areas is advisable and feasible, but although the Office of Civilian Defense recognizes these facts the priorities board states that no metal is available for tags. And to be effective, registration must be done on a national scale. In evacuation of any of these zones, children are the first priority group, and the plans for their removal in an emergency are already under way in most communities. The only question that arises is the feasibility of carrying out such evacuation prior to the expected incident.

The problem of general immunization against communicable diseases is always present. Proclamations have been issued making smallpox and diphtheria prophylaxis mandatory, but it is generally believed that at least tetanus should be added to this list. The camp movement should be extended, not only to provide "war vacations" but also to afford much-needed experience in mass evacuations.

The psychologic reactions of children to war are multiple and complicated, and by no means insignificant. Even toddlers feel the insecurity and actually experience fear. The problem in older children and adolescents is equally acute, and may be associated with even more serious consequences. The number of delinquencies and misdemeanors rises sharply, and such a possibility is being given the greatest attention in this country, following the sad experiences of England early in the war. This problem,

as well as others, is greatly accentuated by the rapid growth of such communities as newly created defense centers. Some areas have already experienced 1000 per cent increases in population. This introduces problems in housing and sanitation and all the difficulties entailed in quarters composed of trailers and improvised shacks. The need for medical care far outstrips the ability of the doctors to handle it. School facilities, in both matériel and personnel, soon become greatly overburdened, and it is freely predicted that all rural schoolteachers who are not already in war industry soon will be. Child labor again rears its head, and the percentage of children employed is already rising sharply in many communities. Home life is disintegrating with the increase of men in various branches of the armed forces and of mothers in war industries. The absence of men leads to a great sense of insecurity. These facts have heightened interest in day care for children. Another potent factor, of course, is the high percentage of early divorces following hasty war marriages, which leave children essentially orphans.

In general, a concerted effort should be made to maintain the standards of child health so far as possible, with concessions only on a temporary basis if absolutely necessary and, then, with the least harm to the children. Furthermore, new and emergency methods should be developed to meet the particular situations arising from the war.

The second speaker of the evening was Dr. Joseph Stokes, of Philadelphia, whose subject was "Communicable Diseases in Army Camps." This was essentially a report of the work of the Board of Communicable Diseases, especially regarding measles and mumps. Although there is a great need in wartime for control of these conditions, an ideal opportunity for investigation is also afforded. During the last war, there were 98,000 cases of measles, with about 40 per cent mortality, and in the 40,000 cases of mumps, the incidence of orchitis varied from 5 to 40 per cent.

In the treatment and prophylaxis of measles, there is a crying need for large amounts of placental extract or pooled immune serum. One advantage of Cohn's albumin in the treatment of shock is the saving of large quantities of globulin, which may be useful in this role. Experiments are now in progress to test the efficacy of this fraction against some viruses, but more study is necessary. At the Army Medical School, there is now a central collecting depot for immune serum. Passive immunity is obviously of no use except on hospital wards, for it lasts only two or three weeks. It is practical, however, when nonimmune patients are on a ward after exposure or are being sent on active duty following a measles outbreak in camp. The sulfonamides are being employed in alternate cases of measles for investigative purposes.

Since the virus of measles has been isolated from the brain of a person dying of measles encephalitis, it is considered advisable to treat such patients early with massive doses of convalescent serum. Similar therapy, consisting of as much as 150 to 200 cc. in children, may modify or even prevent the rash of measles if inaugurated as soon as Koplik spots are noted. To decrease the ever-present danger of cross-infections, the use of propylene glycol vapor and ultraviolet light is being tried in camps.

The only study so far on mumps has been the treatment of alternate patients with convalescent serum to determine its effect on the incidence of orchitis. The use of serum in one series and of incision in another, on alternate cases, is being contemplated. In mumps encephalitis, the virus may also be involved, but the treatment of alternate cases is probably impracticable because of the small number of cases. So far, there have been more cases of mumps than measles, but both diseases have been relatively low in incidence. As a preliminary report, there is a favorable feeling toward the effect of serum on orchitis. The question that there may be some synergistic action of the gonococcus on mumps orchitis has led to the proposal of sulfonamide treatment.

One of the most important interim investigations on measles virus concerns the value of active immunization. In 1935, this virus was first grown on the chick embryo, but there were no studies on transmission in man or monkey until Plotz passed it in successive steps from the embryo to monkeys and back. The virus could be obtained from both the nose and the blood. Shafer et al. exposed human subjects to measles virus following immunization with virus attenuated on chick embryos. Children and monkeys injected with the latter material develop Koplik spots, neutrophilopenia and only rare skin eruptions, which are of a mild nature. Although there is some fever, the malaise is not comparable to that of the usual case, and cough is rare. The resulting disease is even less severe than the attenuated normal disease or that modified by convalescent serum. Of 217 children inoculated with this attenuated virus, only 10 per cent on subsequent exposure contracted moderately severe measles, whereas in the rest the disease was mild or minimal or did not occur. The virus was administered intranasally and intradermally with essentially no difference in results, with the possible exception that intranasal administration seemed to cause some Koplik spots. In another series in which 43 nonimmune subjects were exposed to measles, 25 of the 36 untreated ones developed measles, whereas none of the 7 immunized persons developed the disease. A challenge inoculation of blood from patients with active measles into 15 such actively immunized children resulted in only 5 cases of the disease, 2 of which were modified.

Many years of study are necessary to settle the efficacy of this attenuated virus. There is need for better titration methods, monkey neutralization being the only present means of standardization. Whether to use this in the army is still debatable, since there is still some suggestion that the virus may be reactivated by human passage.

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## GREATER BOSTON MEDICAL SOCIETY

At a regular meeting of the Greater Boston Medical Society held at the Beth Israel Hospital on April 7, Dr. Samuel Silbert discussed "Recent Advances in the Treatment of Peripheral Vascular Disease."

As standard therapy for peripheral obliterative arterial disease, the most important single measure is the absolute abstinence from the use of tobacco. Hypertonic saline solution intravenously was employed in 517 cases of thromboangiitis obliterans, 96 per cent of which, when once cured, remained asymptomatic for two to eighteen years if smoking was discontinued. It has been concluded, therefore, that tobacco causes thromboangiitis obliterans and that treatment affords excellent results if smoking is stopped.

For the relief of pain, the results have been somewhat less striking. Typhoid vaccine has resulted favorably in many cases, but may be dangerous. Five million bacteria are administered in the first dose, and double that amount at each subsequent injection. This form of therapy is not employed in patients over sixty years of age or when the temperature is more than 101°F. Division of the

sensory nerves of the foot was advocated early in the study of the condition, but should properly be reserved for cases not controlled by the usual sedatives or foreign-protein injections, and also only if there is an intractable ulcer. Otherwise, gangrene may ensue. Nerve block has now superseded division, if either is indicated.

Many methods have been suggested to increase the collateral circulation. Since 1922, at Mount Sinai Hospital in New York City, hypertonic saline solution has been routinely injected in 800 obliterative cases. During that period, major amputations have decreased from 62 to 7 per cent. Although the strict adherence to the no-tobacco rule has undoubtedly favorably influenced these statistics, the percentage of amputations is still much smaller than that at other large clinics. This is not claimed as a specific form of therapy, and it may be employed in arteriosclerotic cases. It should be avoided, however, in patients over sixty-five years of age, in cardiac patients and in nephritic patients. Sympathectomy, which was the result of an astute side observation during operations for spastic paralysis, has been employed in increasingly larger series of cases. This operation removes the normal sympathetic vasoconstrictor activity and, in many cases, increases the temperature and the circulation in the affected extremity. However, Dr. Silbert claims no improvement in walking by decrease of the claudication. He has observed no remarkable change in temperature in the muscles on sacral block, spinal anesthesia or sympathectomy. It is concluded that the circulation is not equally increased in all tissues and that this method is adequate for healing indolent ulcers but not for decreasing claudication. On the other hand, the administration of 300 cc. of 5 per cent saline increased the temperature in all tissues of the extremity. A third general method of increasing collateral circulation is the use of venous stasis of some sort. This also is advantageous only in healing stubborn ulcers. This work resulted from war surgery, which demonstrated that if an artery had to be ligated or sacrificed, the limb was much less apt to develop gangrene if the accompanying vein was divided. It allows some nutrition of the otherwise starved tissues. The three commonest methods of accomplishing venous stasis are: the pavex boot, which rhythmically changes the pressure from −80 to +20 mm.; intermittent venous occlusion, which can be conveniently carried out with an ordinary blood-pressure cuff; and the Sanders oscillating bed, which rhythmically changes the position of the lower extremities in relation to the rest of the body.

Dr. Silbert stated that, at his clinic, varicose veins of the leg are now treated by injection rather than by division of the lower branches, an original high saphenectomy having been carried out.

One of the most striking and highly publicized recent advances is that of the employment of cold in peripheral vascular disease. The initial use of warmth in vascular occlusion is now definitely outmoded. Heat not only increases the circulation to a part but also increases the tissue metabolism and oxygen demand. But when the vessels are unable to respond by vasodilatation and the metabolism increases, the tissues merely have their anoxia accentuated. Local heat in proper amounts, however, is beneficial, and a maintenance of a temperature of 95°F., regulated with a thermostat, is now being employed in the chronic stages of vascular disease. In a rapid decrease of blood flow, such as occurs in embolism, cold in the form of ice bags should be immediately applied to the part. Cold has never been observed to do harm when properly used. Later, mild heat should be applied to increase the collateral circulation. Cold may also be used advantageously in many cases as a temporary expedient to allay the pain of sudden vascular occlusion.

Another recent advance is the use of heparin to decrease a thrombotic tendency. Derangement of this tendency causes a great increase in surgical mortality, and the management is complicated by the fact that the emboli and thromboses may be multiple, since one is dealing with a tendency. In fact, thromboses cause 6 per cent of all surgical deaths. The proper use of heparin costs ten to fifteen dollars a day for the necessary 250 to 350 mg. It is usually best administered by the continuous intravenous route in physiologic saline solution. It prolongs the coagulation time, but to a variable degree in different people and in the same person at different times. It is used clinically to prevent postoperative venous thrombosis and arterial thrombosis following embolectomy, accidents and so forth, and in the treatment of pulmonary emboli postoperatively and post partum, to aid thrombophlebitis and to decrease central retinal and coronary thrombosis.

Statistics at the Mayo Clinic indicate that 0.7 per cent of all operations, 1.6 per cent of laparotomies and 2.7 per cent of pelvic operations develop thromboses postoperatively. On that basis, Murray, in Toronto, should have had four thromboses in his 400 cases in which he used heparin routinely postoperatively, but there were none. Dr. Silbert is of the opinion that emboli are not apt to occur when swelling or other inflammatory signs accompany the thrombosis. Heparin may be especially helpful in preventing subsequent emboli in a person who has had a nonfatal one. This substance is far too expensive for general use, and the need for some reasonably priced anticoagulant is evident. A possible solution to this dilemma may be Dicoumarin, a compound discovered and synthesized in 1941 but not as yet commercially available. This substance is effective orally and is administered in doses of 50 to 200 mg. about every two days. The coagulability of the blood is usually not affected for several days, and heparin may be temporarily used at first. The effect also persists for several days after cessation of therapy. The incidence of hemorrhage has been greater than that with heparin at the New York hospitals. Treatment of this complication is by repeated blood transfusions. Prothrombin times should be closely followed, needless to say.

There have been promising developments in nonobliterative arterial disease. In Raynaud's disease, Smithwick's modified preganglionic sympathectomy seems to offer hope of relief. Spiegel considered Raynaud's disease a general metabolic disorder and has shown striking results with the use of diets high in vitamin B. This, of course, cannot affect the irreversible changes of associated scleroderma. Some improvement has been claimed following the use of dihydrotachysterol.

Dr. John Homans opened the discussion by offering some views of one of the Boston schools of thought. Hypertonic saline solution has shown no such striking results, whether because of insufficient intensity or duration of treatment. It has been claimed that no increase of circulation can be demonstrated following its use. The Massachusetts General Hospital group claim improvement by a properly executed sympathectomy in any arterial disease, but Dr. Homans agrees that only limited cases are benefited. Tobacco deprivation is undeniably the best of all treatments for thromboangiitis obliterans. The prevalent fungous infections of the feet, however, should be intensively treated, for they may not only complicate but even have some etiologic role in this condition. Complete agreement was voiced with the speaker's opinions

on the use of heat and cold, except in cases of thrombosis, in which Dr. Homans believes in moderate heat in an attempt to increase the circulation. He is frankly scared by the not infrequent occurrence of deep and wandering thrombophlebitis following even the gradual and careful withdrawal of heparin. He does not accept Murray's statistics.

Dr. E. Everett O'Neil was not sure of the results with hypertonic saline solution. However, sympathectomy is the quickest and most permanent method of increasing the vascular bed in the greatest number of patients in his hands. There is enough spastic element even in the most characteristic obliterative disease to warrant surgical denervation. Twenty-eight per cent of 40 patients had relief of intermittent claudication following sympathectomy. Cold certainly does symptomatically improve both acute and chronic obliterative arterial disease. Refrigeration and the application of a tourniquet have been followed by amputation in two to ten hours, with a great decrease in the amount of shock, bacterial activity and pain. This has been entirely a poor-risk group in whom the mortality has been thus lowered from 100 to 50 per cent, largely because of the decreased shock and lack of anesthesia. These mortality data are almost as good as those from many clinics with selected cases. As for heparin and Dicoumarin, he would rather use femoral ligation if the thrombosis can be located. It is no longer necessary except when the site of the thrombosis is hidden. Besides the slowness of its effects, hemorrhagic reactions of Dicoumarin may not respond to transfusions.

Dr. John Sears congratulated Dr. Silbert on being able to enforce his no-smoking rule so successfully. He has been impressed by the number of patients in Dr. Silbert's clinic who have open lesions but no pain. One interesting group at the Beth Israel Hospital are the patients with definitely proved thromboangiitis, who are now "burned out" and are asymptomatic despite their continued smoking. Since August, 1939, division of the femoral or iliac vein has been immediately carried out as soon as the diagnosis of a deep thrombosis is made. Heparin and Dicoumarin are considered expensive and dangerous.

In conclusion, Dr. Silbert emphasized the fact that tobacco is the one proved factor in thromboangiitis obliterans. Ice bags should be used only for pain, and the extent of their use controlled by the patients' reactions. This does not preclude the use of immediate embolectomy or vein division if the indications are clear. Heparin withdrawal is admitted to entail definite dangers. Sympathectomy may benefit partly by its psychic effects.

## BOOK REVIEWS

*The Retina: The anatomy and the histology of the retina in man, ape and monkey, including the consideration of visual functions, the history of physiological optics and the histological laboratory technique.* By S. L. Polyak, M.D. A fiftieth-anniversary publication of the University of Chicago Press. 4°, cloth, 729 pp., with 100 illustrations. Chicago: The University of Chicago Press, 1941. $10.00.

Nine years of original research in the primate retina and visual pathways are recorded in this volume, whose counterpart, "The Visual Pathway," is now in preparation by the same author.

Three fifths of the book is devoted to a discussion in five sections of methods of investigation, history of visual structure and function from early Greek and Arab times down through European studies to the present time, study of the minute structure of the retina, and an interpretation of function in terms of structure, especially of the neuroepithelium, the conducting fibers and the synapse. Two fifths of the text is devoted to a general outline, to one hundred full-page illustrations amply labeled, to one hundred and twenty-nine pages of bibliography and to a full index of contents.

This work must be read to be appreciated, and as an authoritative and stimulating work it should have its place in the working library of every neurophysiologist, neuropathologist, neurologist and ophthalmologist, especially if such a specialist is engaged in research work or teaching. It is one of the outstanding books of the year in the field of ophthalmology.

*Hugh Young: A surgeon's autobiography.* 8°, cloth, 567 pp., with 91 figures and 18 portraits. New York: Harcourt, Brace and Company, 1940. $5.00.

This autobiography covers seventy years of the striking and somewhat unusual career of a urologist, one of the better known physicians in recent American medicine. An unusual feature of the volume is the inclusion of details of the author's medical work, a section covering about one fifth of the whole book. Over one hundred pages are virtually a textbook of urology, with numerous drawings of surgical operations and urologic instruments. Since Dr. Young was primarily a surgeon, who pioneered in his specialty, he gives the complete story. He justifies his decision in the preface, by writing: "Urology was too important a part of my life to be omitted. That would be sacrificing the true picture." He elected to tell the most important happenings in his medical career, exactly as he would narrate any other event of interest to him. The anatomic and surgical drawings are remarkably clear and labeled so that they can be viewed with understanding by an intelligent layman.

The rest of the story is somewhat less striking. His early life in Texas and at the University of Virginia is well told, but physicians will welcome most his notes on the early days of the Johns Hopkins Hospital, with fleeting pictures of Finney, Osler, Welch, Flexner and, particularly, Halsted. There are no deep characterizations, only touches, leaving one with a desire for more.

Young's later life was one of great activity — in the A.E.F. and in Maryland, where he was energetic in fostering legislation for the control of tuberculosis and the care of the insane. He traveled abroad extensively, and many chapters are devoted to his trips and his interest in sports.

In general, the book is interesting, for the author led a colorful life. There is, however, in the reviewer's opinion, little brilliance and some bad taste. Through it all runs the fixed purpose of advancing urology, and to those particularly associated with this special field of surgery, the book will serve as a milestone in that advance. To others, the book offers some basic material to round out the history of medicine in America.

*Subacute Bacterial Endocarditis.* By Emanuel Libman, M.D., and Charles K. Friedberg, M.D. Edited by Henry A. Christian, M.D., LL.D., Sc.D. (hon.), F.A.C.P., F.R.C.P. (Can., hon.). Reprinted from *Oxford Loose-Leaf Medicine.* 8°, cloth, 108 pp., with 19 illustrations. London: Oxford University Press, 1941. $2.75.

When a physician makes a diagnosis of subacute bacterial endocarditis, he realizes that, at the moment, there is little he can do to help the patient. In view of the rapid advances, however, that have been made by modern chemotherapy, he always looks forward to the time

when some really effective form of therapy for this disease will be devised. And, at such a time, he must be able to recognize the disease in its early stages, when the vegetations are small and before extensive and irremediable structural damage to the tissues has occurred. Consequently, it is gratifying indeed to have this excellent monograph. With the mastering of most of the facts of this book, a physician should find little difficulty in making an early diagnosis. Furthermore, the authors will bolster the morale of the physician, since they state that about 4 per cent of all known cases have a favorable result owing to spontaneous recovery.

This book will also enable the physician to develop a critical estimate of the current literature on the subject. The monograph covers the disease thoroughly, for it is written by well-known clinicians who are keen observers. It also reveals the authority that comes from a wide personal experience, since Dr. Libman himself has personally observed at least 1000 cases from 1899 to 1930.

To review this monograph fully would require a brief summary of every page, because the work is saturated with facts. The bibliography is complete and up to date.

This study should be of value to every clinician. It is also a model for one to follow in the writing of a medical monograph.

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*Synopsis of the Preparation and Aftercare of Surgical Patients.* By Hugh C. Ilgenfritz, M.D., and Rawley M. Penick, Jr., M.D. With a foreword by Urban Maes, M.D., D.Sc. 12°, cloth, 532 pp., with 55 illustrations. St. Louis: The C. V. Mosby Company, 1941. $5.00.

The subject of preoperative and postoperative care was formerly included in the introductory chapters of volumes on surgery. This minor emphasis was in large part responsible for the aphorism that "the operation was successful, but the patient died." The increasing interest in the care of the patient before and after operation is in large part responsible for the reduction in surgical mortality.

This volume is unusually compact, and its size belies the wealth of information that it contains. The opening chapters are devoted to such general considerations as fluid and electrolyte balance. The major and minor complications of surgery are considered in some detail. In addition to the treatment of these conditions, the authors include prophylactic measures that can be taken for their prevention. Finally, there are problems of care peculiar to biliary, thyroid, colonic and other types of surgery.

The authors are to be commended for their editorial policy. The book is easy to read because of the simple manner in which all the material is presented. It is a book that medical students will understand readily and practicing surgeons will find most helpful in the solution of their problems.

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*Essentials of General Surgery.* By Wallace P. Ritchie, M.D. 8°, cloth, 813 pp., with 237 illustrations. St. Louis: The C. V. Mosby Company, 1941. $8.50.

This book, with a foreword by Wangensteen, and with several chapters in special fields written by the author's colleagues, is apparently intended as an introductory textbook of surgery for students at the University of Minnesota Medical School. General principles are stressed, and operative procedures are wisely omitted. The objectives of the author consist "in acquainting students with the fundamental principles of surgery, in instructing them in methods which will enable students to recognize surgical disorders, and finally in teaching them what surgery can accomplish in the treatment of various diseases."

Numerous paragraph headings and subheadings, outline and tabular presentations, and elimination of much discussion of alternative methods of therapy have permitted condensation of the text to a remarkable degree. This condensation has resulted in didacticism in many cases, with omission of necessary relevant discussion and explanation. Thus, the chapter dealing with fractures refers to the Jones sling, the Bellevue splint, Buck's extension, Pott's fracture, Whitman plaster, Maxwell–Ruth traction and the Roger-Anderson method, but there is no description or explanation of what is meant by these terms.

Selected references chiefly to current literature are given at the ends of the chapters, but there is no authors' index, and the student will not find references to such fundamental contributions as Halsted's on carcinoma of the breast, although there is a brief allusion to Halsted's radical mastectomy.

In the main, the text is well written and clear, the illustrations are adequate, and the typography and the format of the book are pleasing.

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## NOTICES

### UNITED STATES CIVIL SERVICE EXAMINATIONS

Junior Medical Officer (Rotating Internship) $2000 a Year
Junior Medical Officer (Psychiatric Resident) $2000 a Year

The Civil Service Commission has announced that positions are available for junior medical officer (rotating internship) and junior medical officer (psychiatric resident) in St. Elizabeth's Hospital for the treatment of mental disorders, Washington, D. C. Applications will be accepted until the needs of the service have been met, and appointments will be known as war service appointments.

The duties of the rotating internships are as follows: under immediate supervision, to admit patients, take histories, make physical examinations and record findings; to make ward rounds of inspection, note charts and record observations; to prescribe for minor ailments or acute emergency cases; to dispense medicine in emergencies; to perform minor surgical operations; to assist at major operations and in redressing; to administer anesthetics; to make routine laboratory tests and analyses; to assist at outpatient clinics in dressing and in administering vaccines; and to keep records, make up case histories and compile statistics requiring medical training. To qualify for this position, applicants must have successfully completed a four-year course in a Class A medical school before the date of appointment.

The duties of the psychiatric residents are as follows: to take histories; to make physical and mental examinations and record the findings; to make rounds of inspection; to make notes; to prescribe for and treat minor ailments; to answer correspondence relative to patients; and to assist the chief of the service in all administrative and professional duties. To qualify for the position, applicants must have successfully completed their fourth year of study in a Class A medical school subsequent to December 31, 1936, and must have the degree of either B.M. or M.D. In addition, they must have successfully completed a rotating internship of at least one year.

No written examination will be required. Qualifications will be judged on the extent of experience, education and training. Applicants must be citizens of or owe allegiance to the United States, and must be physically capable

*(Notices continued on page ix)*

of performing the duties of the position and free from defects or diseases that would constitute unemployment hazards to themselves or danger to their fellow employees.

Forms for application may be obtained from the United States Civil Service Commission, Washington, D. C., or from the Secretary, Board of United States Civil Service Examiners, at any first-class or second-class post office, except in the following cities, where the forms may be obtained from the United States Civil Service District Office: Atlanta, Boston, Chicago, Cincinnati, Denver, New Orleans, New York City, Philadelphia, Seattle, St. Louis, St. Paul, San Francisco, Honolulu, Territory of Hawaii; Balboa Heights, Canal Zone; and San Juan, Puerto Rico.

## SOCIETY MEETINGS AND CONFERENCES

### Calendar of Boston District for the Week Beginning Sunday, August 9

Monday, August 10

12:15-1:15 p.m. Clinicopathological conference. Peter Bent Brigham Hospital amphitheater.

Tuesday, August 11

12:15-1:15 p.m. Clinicoroentgenologic conference. Peter Bent Brigham Hospital amphitheater.

Wednesday, August 12

*12:00 m. Clinicopathological conference. Children's Hospital.

*Open to the medical profession.

September 9–12. American Congress of Physical Therapy. Page x, issue of May 14.

September 29, 30 and October 1. Connecticut Clinical Congress. Yale Law School Building, New Haven, Connecticut.

September 30–October 10. Conference and Course in Legal Medicine. Page ix, issue of July 23.

October 12–23. 1942 Graduate Fortnight. New York Academy of Medicine. Page xi, issue of May 21.

October 14–17. American Academy of Physical Medicine. Hotel Statler, Boston.

October 19–23. 1942 Clinical Congress of the American College of Surgeons. Page ix, issue of February 5.

February 13. American Board of Obstetrics and Gynecology. Page ix, issue of July 2.

April 12–16. American College of Physicians. Page x, issue of July 16.

### District Societies

BRISTOL SOUTH

December 3. Fall River.

May 6, 1943. New Bedford.

PLYMOUTH

October 15. Moore Hospital.

November 19. Plymouth County Hospital.

January 21. Brockton Hospital.

February 18. Jordan Hospital, Plymouth.

March 18. Goddard Hospital.

April 15. Bridgewater State Farm.

May 20. Lakeville.


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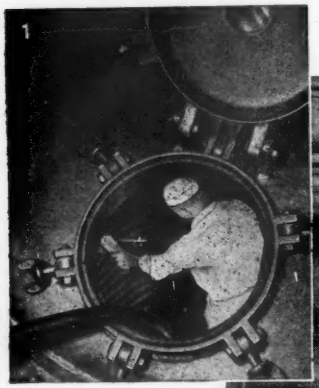

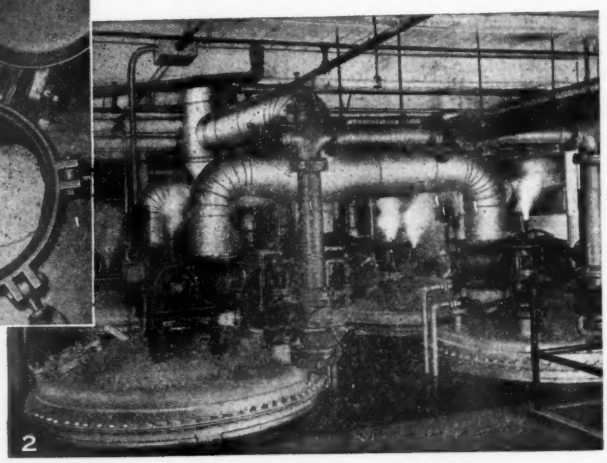

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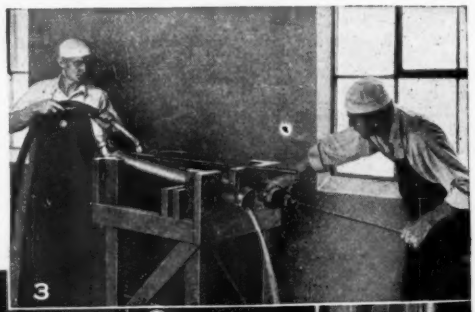

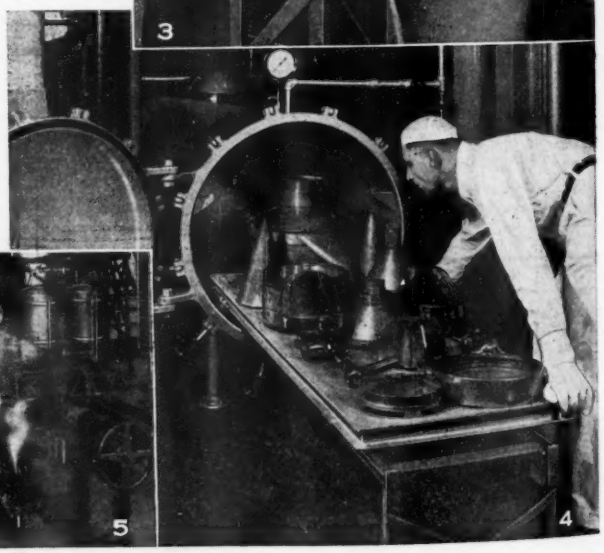

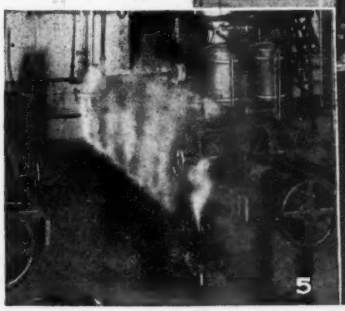

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